MARCH 4, 1961

Chemical Week

A McGRAW-HILL PUBLICATION PRICE FIFTY CENTS

HYDRODEALKYLATION

HYDRODEALKYLATION

HYDRODEALKYLATION

The new plastics –which ones will make top gains in '61? . . . . . **p. 20**

Titanium equipment costs come down. Key: new quantity-casting method . **p. 29**

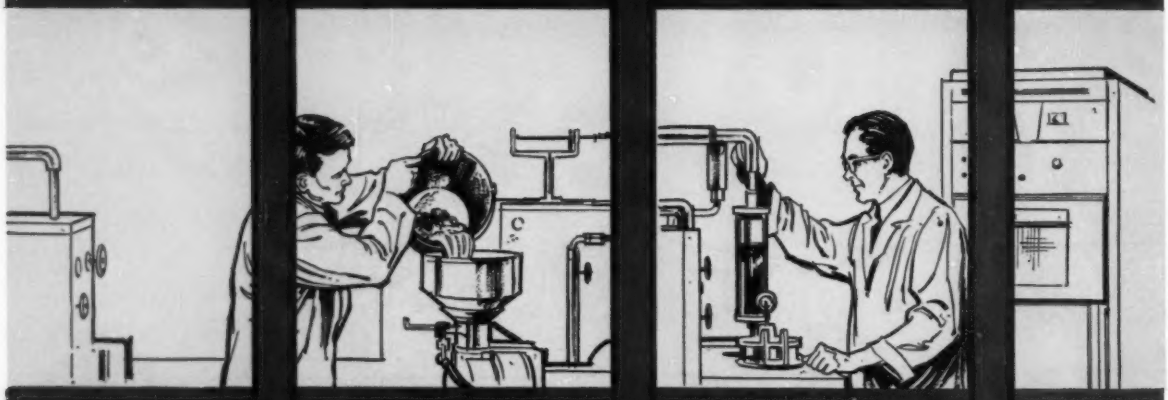
You'll pay more for new salesmen in '61. CW survey tells how much . **p. 41**

Isophthalic acid– 'poor relative' becomes a potent competitor . . . . **p. 63**

HYDRODEALKYL-ATION: HOTTEST WORD IN PETRO-

BONUS FOR ALKALI USERS...

synergized technical service from fmc®



The new wing at our Princeton Research Center houses the combined application research staffs of all FMC Inorganic Chemical Divisions.

Working there as an integrated team, their over-all capabilities are vastly multiplied. They have the newest equipment to reproduce many of the important basic processing operations used in the industries we serve. And they are closely supported by our superbly equipped analytical-research groups.

This modern, customer-service laboratory is another FMC activity designed to help you use our products more effectively and economically. It supplements the valuable assistance rendered in customers' plants by engineers, technicians and industry specialists working out of our plants, offices and laboratories.

Remember this outstanding service the next time you have a problem involving alkalis. And next time you're in the market for alkalis, remember FMC.

CAUSTIC SODA 50% and 73% Liquid, Regular and Rayon Grades; Flake, Solid and Ground
CAUSTIC POTASH 45% and 50% Liquid; Flake **SODA ASH** Light, Intermediate and Dense Grades

Putting Ideas to Work

FOOD MACHINERY AND CHEMICAL CORPORATION

Chlor-Alkali Division

General Sales Offices:
161 E. 42nd STREET, NEW YORK 17

AA Quality:

AMMONIUM SILICOFLUORIDE

MAGNESIUM SILICOFLUORIDE

POTASSIUM SILICOFLUORIDE

SODIUM SILICOFLUORIDE

ZINC SILICOFLUORIDE

SILICOFLUORIDE MIXTURES

UNMATCHED IN SILICOFLUORIDES!

Our position in silicofluorides is simple; our production facilities are unmatched in number, capacity and quality. A complete line of AA Quality silicofluorides is available nationwide. We are well experienced in their large-quantity, high-quality production. Those who buy silicofluorides from us have reason to know that the AA Quality symbol applies to service and dependability as well as product analysis. Why not make our Chemical Division at least one of your sources for silicofluorides?

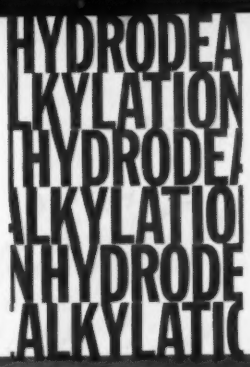
Chemical Division

The **American Agricultural Chemical** Company

100 Church Street
New York 7, New York

40 plants and offices

ON THE COVER: Forming this week's cover pattern is a word that is on the lips of petrochemical makers from coast to coast. For hydrodealkylation's meaning to the CPI, see p. 46.



Chemical Week

Vol. 88, No. 9 MARCH 4, 1961

5 **VIEWPOINT**—What is the CPI?—key question for new chemical makers.

7 **LETTERS**

7 **MEETINGS**

17 **BUSINESS NEWSLETTER**

20 Plastics outlook for '61: output to hit 6.5 billion lbs., but sales an enigma.

21 Latest merger moves throw little light on new antitrust policies.

22 Du Pont's G. M. holding at stake as U.S. asks 'dramatic' divestiture.

22 Steel mill expansion will mean boost for Baltimore's chemical complex.

23 Summit talks may bring European trade blocs closer together.

25 **WASHINGTON NEWSLETTER**

29 **PRODUCTION**—New casting process promises cheaper titanium equipment.

41 **SALES**—New marketing recruits get record starting salaries.

43 Spencer promotes plastics with an offbeat direct-mail effort.

44 Major aluminum producers join forces to push automotive applications.

46 **ENGINEERING**—Hydrodealkylation routes vie for lead in aromatics race.

52 **TECHNOLOGY NEWSLETTER**

53 **SPECIALTIES—Texas Butadiene introduces new styrene-maleic anhydride resin.**

54 Aerosol contraceptive is marketed in U.S.

56 Soap and synthetic detergents sales hit new high in '60.

56 Chrysler Corporation begins selling consumer car products overseas.

59 **MARKET NEWSLETTER**

63 Isophthalic acid girds for stiffer competition with phthalic.

69 **RESEARCH—New analytical instruments permit ultrahigh purity standards.**

76 **BUSINESS BENCHMARKS**

Chemical Week (including Chemical Specialties and Chemical Industries) is published weekly by McGraw-Hill Publishing Co., James H. McGraw (1860-1948), founder. EXECUTIVE, EDITORIAL, CIRCULATION AND ADVERTISING OFFICES: McGraw-Hill Building, 330 West 42nd St., New York 36, N. Y. Telephone, LO 4-3000; Teletype, TWX N. Y. 1-1636; Cable, McGRAWHILL, N. Y. Place of publication: Philadelphia, Pa. Second class postage paid at Philadelphia. (See below for directions regarding subscriptions or change of address.) OFFICERS OF THE PUBLICATIONS DIVISION: Nelson L. Bond, president; Shelton Fisher, Wallace F. Traendly, senior vice-presidents; John R. Callaham, vice-president and editorial director; Joseph H. Allen, vice-president and director of advertising sales; A. R. Venezian, vice-president and circulation coordinator. OFFICERS OF THE CORPORATION: Donald C. McGraw, president; Joseph A. Gerardi, Hugh J. Kelly, Harry L. Waddell, executive vice-presidents; L. Keith Goodrich, vice-president and treasurer; John J. Cooke, secretary.

United States and United States possessions subscription rate for individuals in the field of the publication, $3 per year; single copies, 50¢. Foreign subscription rates per year: Canada, $4; other Western Hemisphere countries, $15; all others, $25, payable in advance. Printed in U.S.A. Title registered in U.S. Patent Office,

Subscriptions to Chemical Week are solicited from management men in the Chemical Process Industries in administration, production and plant operation, design and construction, research and development, sales and purchasing. Position, company connection and nature of company's business, products and approximate number of employees must be indicated on subscription application. Send to address shown below.

SEND SUBSCRIPTION CORRESPONDENCE AND CHANGE OF ADDRESS TO FULFILLMENT MANAGER, CHEMICAL WEEK, 330 WEST 42nd ST., NEW YORK 36, N. Y. SUBSCRIBERS SHOULD NOTIFY FULFILLMENT MANAGER PROMPTLY OF ANY CHANGE OF ADDRESS, GIVING OLD AS WELL AS NEW ADDRESS, AND INCLUDING POSTAL ZONE NUMBER, IF ANY. IF POSSIBLE, ENCLOSE AN ADDRESS LABEL FROM RECENT ISSUE OF CHEMICAL WEEK. PLEASE ALLOW ONE MONTH FOR CHANGE TO BECOME EFFECTIVE.

Postmaster: Please send Form 3579 to Chemical Week, 330 West 42nd St., New York 36, N.Y.

A SKILLED HAND IN CHEMISTRY . . . AT WORK FOR YOU

Nopco makes water work

For over 50 years we have been changing the basic characteristics of water . . . to make it more appropriate to industry's needs. For this purpose we make a comprehensive variety of surfactants — chemicals such as detergents, emulsifiers, dispersants, wetting agents and defoamers. Add these to water . . . and paintmakers formulate new and better paints; papermakers roll out whiter, cleaner papers and at a faster rate; textile manufacturers have better control over dyeing and finishing processes. Wherever industry uses water, there's a Nopco chemical ready to improve its performance.

Lubricants	
Detergents	Dispersants
Plasticizers	Wetting Agents
Softeners	Defoamers
Emulsifiers	Stabilizers

NOPCO CHEMICAL COMPANY

60 Park Place, Newark, N.J.

Plants: Harrison, N.J. • Carlstadt, N.J. • Richmond, Calif. • Cedartown, Ga. • London, Canada • Mexico, D.F. • Corbeil, France • Sydney, Australia

Manufacturing Licensees Throughout the World

NOPCO®

Chemical Week

Robert S. Muller ..... Publisher

Howard C. E. Johnson ..... Editor-in-Chief
Ralph R. Schulz ..... Managing Editor
Emil J. Mikity ..... Assistant Managing Editor
J. Robert Warren .... Assistant Managing Editor
Donald P. Burke ..... Associate Editor
Anthony J. Piombino ..... Associate Editor

DEPARTMENTS

Administration ..... Joseph F. Kalina, editor
Business News ..... Homer Starr, editor
Charles Joslin; F. Bryan Williams
Engineering ..... Ryle Miller, editor
Donald M. Levin
Foreign ..... Bruce Bendow, editor
Markets ..... Philip A. Cavalier, editor
Richard T. Ozimek
Production ..... Herbert C. Short, editor
Research ..... Philip A. Untersee, editor
Sales ..... Carl A. Hiester, editor
Victor H. Waldrop
Specialties ..... Richard J. Callahan, editor
Marion L. Meade
Reports ..... Jorma Hyypia, editor
Copy ..... William Mullinack, editor
Kay Sarner; Patricia Moffitt
Art ..... Robert T. Martinott, director
Richard Kluga; Forbes Linkhorn
Dolores Able
Buyers' Guide ..... Betsy L. Emery, editor
Patricia Middleton

REGIONAL EDITORS

Chicago ..... John M. Winton, editor
Nina Seawick
Houston ..... Thomas H. Arnold, editor
Wilma Cortines
San Francisco ..... Martin D. Robbins, editor
Maria Theresa Shaw

NATIONAL AND WORLD NEWS

Douglas Greenwald ..... Economics
John Wilhelm ..... Director, News Bureaus

Domestic

Atlanta, B. E. Barnes; Chicago, Stewart Ramsey; Cleveland, Arthur Zimmerman; Dallas, Marvin Reid; Detroit, Donald MacDonald; Los Angeles, Kemp Anderson, Jr.; San Francisco, Jenness Keene; Seattle, Ray Bloomberg; Washington, George B. Bryant, Jr. Correspondents in 75 principal cities of the United States.

Foreign

Beirut, O. M. Marashian; Bonn, Peter Forbath; Caracas, John Pearson; London, John Shinn; Melbourne, Alicja Grobtuch; Mexico City, Peter Weaver; Moscow, Ernest Conine; Paris, Robert Farrell; Rio de Janeiro, Leslie Warren; Tokyo, Sol Sanders. Correspondents in 78 cities.

Knox Armstrong .... Advertising Sales Manager
Alvin J. Babkow ..... Business Manager
Fred E. Lesner ..... Sales Promotion Manager
John M. Pierce..... Market Service Manager
Robert L. Maier ..... Advertising Makeup
Paul W. Erb ..... Circulation Manager
Frances Regan ..... Reprints
Advertising Salesmen ..... See Adv. Index

What is the CPI?

EARLY THIS WEEK we were in New Orleans attending the first and successful AIChE exposition for the petroleum refining and petrochemical industries, two fields that are among the largest comprising the chemical process industries—CPI for short. While there we reflected on the large number of "industry hats" our editors must wear in covering, and interpreting the significance of, developments in the area CHEMICAL WEEK has staked out, viz., the CPI.

Your industry is a part of the CPI if you are (1) a manufacturer who utilizes chemical engineering processes and equipment in producing, processing or using heavy chemicals, fine chemicals or chemical raw materials; (2) a converter of chemicals into more usable forms; or (3) a manufacturer or processor of natural raw materials using products of chemical-producing or chemical-converting industries. Although widely diversified in end-products, the different segments of the multi-industry CPI are close-knit in operations through the use of similar processes, raw materials, equipment and services, with basic chemical engineering technology as the CPI's common denominator.

Some of the larger industry components of the CPI are chemicals and petrochemicals, petroleum and coal products, fertilizers, rubber, drugs and medicines, plastic materials, pulp and paper, soap and allied products, and lime and cement. Combined, the value of products from the 18 major industry branches in the CPI will total about $96 billion this year.

We must always take the over-all look at CPI developments and trends. For example, our market or news roundup stories on benzene must include coal-tar as well as petroleum-derived benzene (the molecules don't know their father). Within the confines of our definition of the CPI, our editorial boundaries are extensive.

There is no question but that this very extensiveness poses a problem—viz., seeking out those newsworthy developments that are of common interest to a broad group of industries. But the problem is not so great as it might first appear, since—as we have mentioned—these industries are bound together by a primary interest in chemicals and chemical technology.

This point is made clear by the oil industry itself, which is largely not part of the CPI. Exploration, drilling, production and marketing of gasoline and other petroleum fuels lies outside of our scope; but refining and petrochemical production belong squarely in the CPI. Major oil companies like Phillips and Shell, among others, have recognized the distinction by setting up separate chemical entities; others, like Texaco, have established joint petrochemical subsidiaries with chemical firms.

Nonchemical companies entering the CPI must recognize the distinction or perish. They must learn not only a new technical vocabulary, but a new business vocabulary as well: familiar concepts on depreciation, profit margins, research, and other factors must be modified—or even scrapped—to be replaced by concepts that recognize the uniqueness of the CPI.

Meanwhile, back in New Orleans, we again sensed the enthusiasm for the Gulf Coast that is sure to result in another round of CPI expansions there: several projects have been announced in recent weeks. Look for CHEMICAL WEEK to bring you news of significant developments in natural gas processing, petroleum refining and petrochemical processing as well as of all other branches of the CPI.

Fuming Over Packaging Failures?

Polyethylene Packages Chemicals Best!

SEE HOW MANY WAYS YOU CAN USE POLYETHYLENE:

- As a film for packaging fine chemicals and pharmaceuticals.
- As film liners for metal and fibre drums for both liquids and solids.
- As inner coatings on drums.
- As extruded coatings and inner liners for multiwall bags.
- And, molded into light, conveniently handled containers for most strong acids and other reactive materials.
- As a combination with foil and other substrates for specialized chemical packages.

Because polyethylene builds you a tough, flexible, easy to handle package with outstanding impermeability... all at a new low cost... it's no wonder that polyethylene today stands head and shoulders above any other material for packaging a large variety of chemical products.

Chances are excellent that there is a polyethylene which you can use in your chemical packaging operations. And, UNION CARBIDE offers a complete range of BAKELITE polyethylene resins and compounds—the widest selection from any manufacturer. For more information, see your packaging supplier. He will gladly specify the correct ones to match your needs. Or write: Dept. LD-27C, Union Carbide Plastics Company, Division of Union Carbide Corporation, 270 Park Ave., N. Y. 17, N. Y. *In Canada:* Union Carbide Canada Limited, Toronto 12.

Be sure to ask your packaging supplier about Bakelite high-density polyethylene—a new coating material that gives Kraft multiwall bags better moisture protection than low-density coatings of approximately *twice the thickness.*

UNION CARBIDE

BAKELITE and UNION CARBIDE are registered trade marks of Union Carbide Corporation.

LETTERS

Younger than Realized

To THE EDITOR; I enjoyed the reminder (*Jan. 21, p. 6*) that CHEMICAL WEEK is 10 years old.

I wasn't aware of it, since I have been "brought up" in this field in part by CHEMICAL WEEK. If you hadn't told me it was 10 years I would have guessed it was much longer. Good luck on the next 100 years.

SIDNEY GROSS
Vernon Pope
New York

No Easy Solutions

To THE EDITOR: Your editorial "Who Pays the Piper?" (*Jan. 14, p. 5*) seems to make a brave attempt to deal with one of the most complex problems facing modern man. "How can the fantastic problems associated with modern technology be brought to the people so that they may weigh the pros and cons affecting them?"

Certainly, Du Pont's Dawson has a realistic viewpoint when he states that the judgment of risk vs. gain must be considered. Many will argue with him, however, and insist that it's up to the people to consider this judgment of risk vs. gain.

To what extent your hope can be realized that federal agencies can take over the achievement of proper balance patterned after the Interstate Commerce Commission and the Federal Communications Commission, I'm in no position to state.

One thing I question is your [contention that] . . . the optimum balence of risk and gain will be achieved when progress is not slowed and the public does not become alarmed. What traditional basis have you for your feelings that this balance can be achieved by the best judgment of responsible scientists?

The present state of confusion in the problems of nuclear energy—progress vs. genetic risk, at the least, and elimination of mankind, at the worst—is typical of the type of problem that civilization now is confronted with. How do you see responsible scientists judging this one?

May I suggest that you consider solutions of the problem from a much more tentative point of view. May I encourage you to seek new social organizations and new social concepts to cope with the increasingly complex problems of man. Ideas dealing with involved problems usually evolve slowly, and our chances of discovering such solutions, it seems to me, are improved as we become more tentative, more exploratory, and less didactic.

My compliments to you for your boldness in dealing with this problem area. May I add my encouragement that you do so again, and again, and again.

MILLARD ZEISBERG
Executive Director
Atoms & US, Inc.
Newark, Del.

Trade Policy Confusion

To THE EDITOR: Allow me to congratulate you on your editorial "No Selling Without Buying" (*Feb. 11, p. 5*).

It is very comforting to know that there is someone else equally confused by those people who seem to have no difficulty in taking a stand that the rest of the world should buy more and more of our products, while continuing to be happy about shipping less and less to us.

R. TRUBEK
The Trubek Laboratories Inc.
East Rutherford, N.J.

MEETINGS

National Assn. of Corrosion Engineers, annual conference, Statler Hotel, Buffalo, N.Y., March 13-17.

Synthetic Organic Chemical Manufacturers Assn., luncheon meeting, Hotel Roosevelt, New York City, March 14.

American Society of Tool and Manufacturing Engineers and **Society of Plastics Engineers,** meeting, "Plastics for Tooling Meeting," Statler-Hilton Hotel, Detroit, March 15.

Commercial Chemical Development Assn., Hotel Roosevelt, New York City, March 15-16.

Textile Research Institute, annual meeting, Commodore Hotel, New York City, March 16-17.

American Institute of Chemical Engineers (Chicago section), symposium; themes: new developments for chemical processing, new developments for the engineer and management; Conrad Hilton Hotel, Chicago, March 22.

AMOCO ISOPHTHALIC Acid-95

(test marketed as IRAA)

available now in commercial quantities

Polyester resin manufacturers—here's your needed new source for Isophthalic Acid. Check these quick facts.

You get these

Finished Product Benefits

- Using AMOCO Isophthalic Acid-95 you get the superior qualities normally associated with an IPA based resin—(1) A better combination of rigidity and impact strength, (2) Better strength retention after environmental aging, (3) Better resistance to chemicals and acids.
- Potential savings—You get the above benefits at higher styrene levels in the finished product.

You get these

Product Quality Benefits

- AMOCO Isophthalic Acid-95 contains uniquely low concentrations of heavy metals and of total metals.
- With AMOCO Isophthalic Acid-95 there is less oxygen sensitivity during processing thus reducing the number of precautions necessary when making Isophthalic resins.
- Uniform polyester quality from batch to batch.
- Contains no measurable quantities of nitrogen or sulfur.
- Permits manufacture of resins with better shelf stability at lower inhibitor levels.
- Permits the manufacture of lighter colored resins.

You get these

Packaging and Shipping Benefits

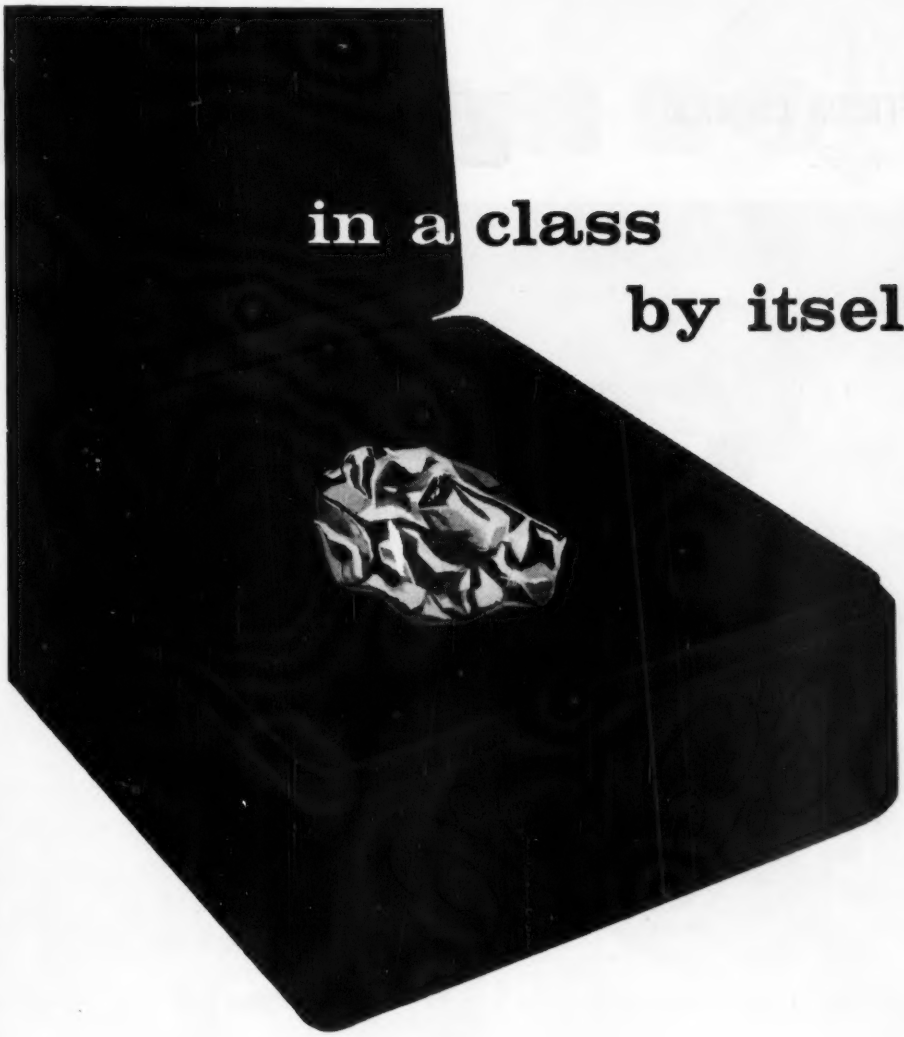
- A Midwest manufacturing source—Joliet, Ill.
- Availability in commercial quantities from the Joliet plant and from warehouses in New York, Cleveland and Detroit.
- Available in 80 lb. bags in conventional or unitized shipments.

AMOCO
CHEMICALS
CORPORATION

Department 4884

AMOCO
CHEMICALS

130 East Randolph Drive, Chicago 1, Illinois



Piccolyte

Truly, there is nothing quite like PICCOLYTE. This is a true polyterpene hydrocarbon resin, neutral and light in color. New production facilities make it available in very large quantities. Piccolyte is water, alkali, and acid-resistant, with broad solubility and compatibility characteristics. Available in melting point grades from 10°C through 135°C (B & R), solutions in mineral spirits.

Piccolyte's outstanding advantages are used in caulks, cements, chewing gum, leather treating, paint, paper coatings, adhesives, printing ink, rubber, textiles, and wax compounding.

The trademark of quality

PENNSYLVANIA INDUSTRIAL CHEMICAL CORPORATION
CLAIRTON, PENNSYLVANIA

HARDWORKING JEFFERSON CHEMICALS

ETHAN

Monoethanolamine gives woolens a new crease memory

USDA researchers have found that dilute solutions of monoethanolamine will put long-lasting creases in wool. The creases reportedly stay through long exposure to rain and high humidity, and, if the fabric is suitably shrink-proofed, the creases remain after machine washing.

Apparently the monoethanolamine solution affects the molecular structure of the fibers, imparting a "crease memory" to the fabric. Monoethanolamine has the added advantage of being nonvolatile, odorless, safe to handle, and harmless to the fabric. The solution is applied by spraying or dipping with a 0.5 to 2.0 percent solution of monoethanolamine in water, with a small amount of surface-active agent to facilitate wetting. Eventual aim of this process . . . place venerable woolens in the same "wash and wear" class as the youthful synthetics.

Mono-, di-, and triethanolamine are hygroscopic, nonvolatile, mildly alkaline viscous liquids, miscible with water and most alcohols and polyols. Being bifunctional, they can react with acidic materials to form esters or amides or salts, and most of their applications depend upon these versatile features. Some of the diverse applications of these amino alcohols are: gas-scrubbing agents for removal of hydrogen sulfide and carbon dioxide; chemical intermediates in surface-active agents, rubber chemicals, textile specialties, waxes and polishes, herbicides, petroleum demulsifiers, toilet goods, cutting oils, antibiotics and other materials.

Let Jefferson's experienced technical service people help you in any phase of your work with ethanolamines.

OLAMINES

MONO-
DI-
TRI-

MONOETHANOLAMINE

SPECIFICATIONS

Specific gravity, 20/20°C.	1.0170 min.
	1.0190 max.
Boiling range, ASTM, °C.	
IBP:	166 min.
DP:	174 max.
Equivalent weight	61.0 min.
	62.5 max.
Color, Pt-Co scale	15 max.
Odor at room temperature	Mildly ammoniacal

SELECT PROPERTIES

Boiling point, 760 mm.	170.5°C.
Flash point (open cup)	200°F.
Melting point	10.5°C.
Vapor pressure, 20°C	1 mm. Hg.
Weight, 20°C.	8.47 lbs./gal.

DIETHANOLAMINE

Specific gravity, 30/20°C.	1.0900 min.
	1.0950 max.
Equivalent weight	104.0 min.
	106.0 max.
Color, Pt-Co scale	20 max.
Diethanolamine, wt.%	98.0 min.
Monoethanolamine, wt.%	1.0 max.
Triethanolamine, wt.%	1.5 max.
Water, wt.%	0.15 max.

Boiling point, 760 mm.	269°C. (decomposes)
Flash point (open cup)	280°F.
Melting Point	28.0°C.
Vapor pressure, 20°C	< 0.01 mm. Hg.
Weight, 30°C.	9.09 lbs./gal.

TRIETHANOLAMINE

	Standard Grade	99% Grade
Specific gravity, 20/20°C.	1.1220 min.	1.1240 min.
	1.1300 max.	1.1270 max.
Equivalent weight	140.0 min.	148 min.
	145.0 max.	150 max.
Color, Pt-Co scale	75 max.	75 max.
Triethanolamine, wt.%	85.0 min.	99.0 min.
Monoethanolamine, wt.%	0.5 max.	—
Diethanolamine, wt.%	15.0 max.	—
Water, wt.%	0.2 max.	0.2 max.
Odor	Not more than slightly ammoniacal	
Iron, ppm.	—	10 max.

Boiling point, 760 mm.	360°C.
Flash point (open cup)	365°F.
Melting point	21.2°C.
Vapor pressure, 20°C	< 0.01 mm. Hg.
Weight, 20°C.	9.37 lbs./gal.

Above products are clear and substantially free of suspended matter.

SHIPPING AND HANDLING

Jefferson ethanolamines are available in tank cars, tank wagons in certain areas, and 17E non-returnable steel drums of 470 (mono-), 490 (di-) and 520 (tri-) pounds capacity from the Port Neches plant or terminals throughout the country.

Handling and storage of ethanolamines is a straightforward operation. Storage tanks should be of carbon steel according to approved codes. In general, if low color amine is needed, stainless steel tanks and heating coils are preferable to carbon steel. Storage temperatures in excess of 120°F. should be avoided. Normal precautions to guard against excessive atmospheric moisture should be taken.

TECHNICAL INFORMATION

For detailed data on uses, properties, handling and other aspects of ethanolamines ask for our new ETHANOLAMINES Technical Brochure, or contact our technical service people . . . Jefferson Chemical Company, Inc., 1121 Walker Avenue, P. O. Box 303, Houston 1, Texas.

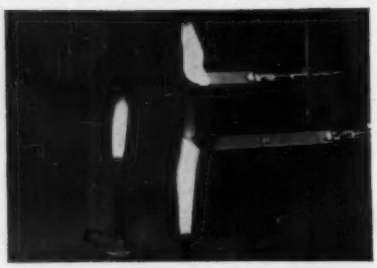
HOUSTON • NEW YORK • CHICAGO • CLEVELAND
CHARLOTTE • LOS ANGELES • SAN FRANCISCO

JEFFERSON CHEMICALS

AROCLOR®

...key to lower-cost, fire-resistant, job-tailored epoxies!

Formulators and users alike have alternately sung lyrical praises and growled over the fast-setting, tight-bonding, rock-hard epoxies. Chief reasons for the praise have been the resins' fantastic impact strength, their chemical resistance, their versatility of application—from the making of plastic metal-stamping dies to tank linings and body solders. The growls stem from their cost, from 60 to 70 cents a pound, and because the resins burn lustily—a distinct drawback in certain applications, such as laminates for electrical uses. Flameproofing curing agents and resins runs the cost still higher. But now a series of property-modifying, low-cost chlorinated polyphenyls has come forward to make epoxy resin formulations both fire-resistant and significantly cheaper by the pound.



In these flame tests, one epoxy strip ignites and burns rapidly; the other, containing Aroclor, won't ignite at all.

The several hundred specialty formulators of epoxy resins (as well as the seven basic manufacturers) have uncovered a way to "job tailor" epoxies. The method is simplicity itself: just mechanical mixing into the formulation of the right amount of a selected chlorinated polyphenyl. The chlorinated polyphenyls, supplied by Monsanto under the registered trademark Aroclor, "adjust" the uncured epoxy formulations' viscosity, and the cured resins' hardness and flexibility. Most important—the addition of an Aroclor makes the epoxy formulation cheaper per pound and fire-resistant.

The Aroclor compounds, it proves out, are one of the very few materials *compatible* with epoxies. And, happily, they come as a series of some dozen liquids and solids that range from water-white mobile "oils" and clear, viscous resins to bright, pale-yellow solids resembling a good-color rosin. Chemically, the materials are progressively chlorinated di- and polyphenyls—each containing a definite percent-by-weight of inert, tightly bound chlorine.

The Aroclor compounds are some of the most *inert*, chemically stable compounds in industry. They are impervious to heat, acids, alkalis, and they are among the most ignition-resistant compounds commercially available. Most important, they are cheap—in the carload range of 16 to 19 cents per pound. When added to epoxy formulations, the liquid Aroclor compounds function as low-cost plasticizers; the solids, as reinforcing resins. Since the mobile "oil-y" forms can be mixed in any proportion with the viscous and solid resin forms, the Aroclor compounds give the epoxy formulator a perfectly gradated viscosity range of "diluent" that can plasticize or reinforce, that cuts costs, and imparts fire resistance.

With epoxy usage now in the 60-70 million pounds per year range, it is estimated that formulators supplying ready-to-use resins for about one third of the applications can significantly improve their offerings (and lower materials costs) with the use of this new technique. When used in the range of 15 to 20 parts per hundred, the Aroclor compounds greatly retard the epoxy's burning rate, and proper selection of the Aroclor compounds can impart variously: improved flow, better flexibility after curing, and better flexural and compressive yield strengths.

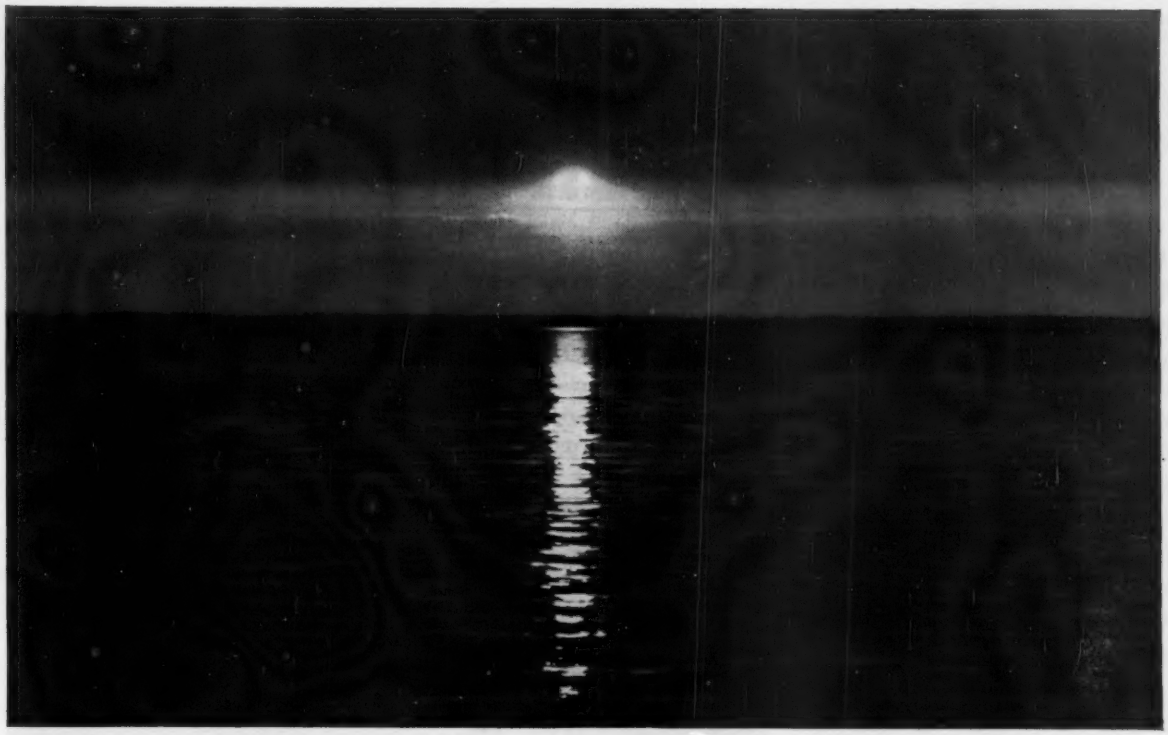
Since five of approximately a dozen Aroclor compounds provide a five-step variance in viscosity—ranging from almost water-like liquids to solid resins with a softening point of about 300° F.—the range of modification possible for any particular epoxy formulation is enormous. For example, solid Aroclor 5460 used in the amount of 15 PHR (plus 5 PHR of antimony oxide) acts as a reinforcing resin and produces a nonburning composition. The cured resin compares in "strengths" to an identical control without Aroclor and antimony oxide as follows:

	Control	15 PHR Aroclor 5460; 5 PHR antimony oxide
Flex Strength.....	16,900 psi	19,000 psi
Tensile.....	11,000 psi	10,200 psi
Compressive Ultimate Strength	23,400 psi	40,700 psi
Hardness (Rockwell "M")	111	111
Heat-Distortion Temp., °C.....	143	135
Burning Rate (ASTM 635-56T)...	.6 in./min.	nonburning

The low-molecular-weight liquid Aroclor compounds show a definite plasticizing effect. With liquid Aroclor additions, the heat-distortion temperature is somewhat lowered; the solids, on the other hand, show little significant effect on the heat-distortion temperature.

Depending upon the ultimate use of the epoxy formulation, producers will have to work out their own recipes. Hundreds of modifications are possible with "amine"-type cures and also with a "phthalic anhydride" cure. The nonburning benefit of adding Aroclor and antimony oxide should prove particularly valuable in laminates for printed circuits and other electrical uses. The modification of handling properties, the reinforcing effect, and the maintenance of excellent chemical resistance should have application in adhesives, surface coatings, encapsulation compounds, plastic stamping dies, and body solders. And the cost savings can hardly fail to catch the interest of all epoxy formulators.

For further information on developing lower-cost nonburning epoxy formulations, request a copy of Specialty Data Report CS-14: "AROCLOR, Fire-Retarding Plasticizers and Modifiers for Epoxy Resins." Address your request to Monsanto Chemical Company, Organic Chemicals Division, Department 4430Y, St. Louis 66, Mo.



America's troubled waters

This water, like all the other streams, lakes and wells in America, contains problems in every drop.

It must become all things to all men.

To thirsty America, it must become pure.

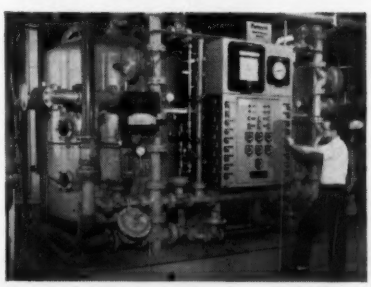
To food-processing America, it must become soft, free of magnesium or calcium salts.

To boiler-operating America, it must become non-corrosive, non-scaling.

To highly technological America, it must often become so free of minerals that its purity is measured by its resistance to electricity.

And to *all* America, it must become abundant—because we are using it at the rate of 1,333 gallons per person per day.

Treating troubled waters is the primary objective of our Permutit Division. At Birmingham, New Jersey, Permutit operates one of the nation's largest water analysis laboratories, checking problem water for industry, municipalities and countless individual home owners. From the desks and drawing boards of a hundred engineers and designers in New York City come Permutit designs and specifications for equipment that will take the problems out of water. And from factories in Lancaster, Pennsylvania and Birmingham, New Jersey comes the equipment to do this job.



FLUIDICS AT WORK

Problem water is no problem to Permutit. From automatic water softening for the home to the creation of a new kind of water—"Ultimate" water, more pure than nature ever produced—Permutit has served as headquarters for advancements in the art of water treatment.

Typical recent development: New Permutit packaged demineralizers (shown in the picture to your left), which are delivered pre-assembled, ready to start automatic operation.

FLUIDICS AND YOU. The search goes on, through Fluidics . . . the Pfaudler Permutit program that finds better ways to handle liquids and gases.

How soon will *you* have a water problem? Be ready with the answers. Send for our bulletin, "An Outline of Modern Water Treatment Equipment." Or if you have specific questions please call your local Permutit field engineer or write directly to the Permutit Division, Dept. **CW-31,** 50 West 44th Street, New York 36, New York.

PFAUDLER PERMUTIT INC.

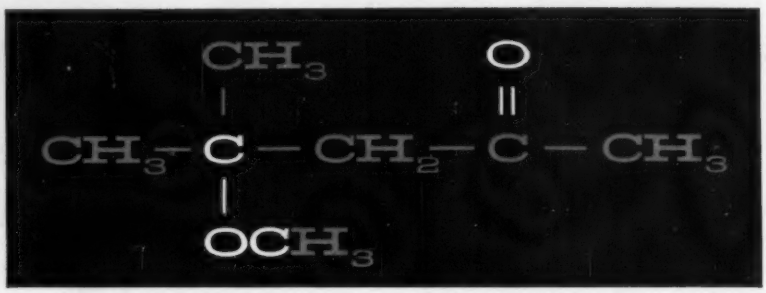
A world-wide company with plants in Germany, Great Britain, Canada, Mexico, Japan, as well as the U.S.A.

BULLETIN:

Comparative data on Shell Chemical's high boiling Pent-Oxone* solvent promises lower costs on vinyl lacquers

Pent-Oxone solvent is a keto-ether. It is a remarkable new compound of this class of chemical which gives you double solvent action plus high diluent tolerance for use with a wide range of lacquer resins.

Read how Pent-Oxone solvent compares with other high boiling vinyl solvents in evaporation and viscosity, what it costs, and where it is finding new applications in and out of the coatings industry.



Solvent action in glycol ethers comes from the COC ether linkage. In ketones, the double bond oxygen does the work. Shell Chemical's Pent-Oxone is the only commercially available solvent with *both* these functional groups.

BECAUSE it combines the solvent properties of ketones and glycol ethers in one molecule, Shell Chemical's new Pent-Oxone gives you greater solvent potential than any other type of high boiler.

This potential can often save you money. In vinyl lacquers, Pent-Oxone can replace high boilers costing 40¢ to $1.10 more per gallon.

Comparative evaporation data

Pent-Oxone is in the high boiling class with an evaporation rate comparable to cyclohexanone and EGMEE acetate. Comparisons with cyclohexanone and isophorone in seconds are as follows:

Per Cent evap.	cyclo-hexanone	Pent-Oxone	iso-phorone
10%	180	231	2600
30	560	715	8300
50	940	1200	14200
70	1330	1680	20600
90	1720	2175	27600
95	1825	2310	29500
100	2120	2450	34000

Comparative viscosity data

The following viscosity comparisons are taken after one hour on a 50/50 solvent/toluene mixture with the indicated Vinylite** resin:

10% VYNS-3	Pent-Oxone	93 cps.
	cyclohexanone	54 cps.
20% VMCH	Pent-Oxone	125 cps.
	cyclohexanone	142 cps.
	isophorone	260 cps.
20% VYHH	Pent-Oxone	310 cps.
	cyclohexanone	232 cps.
	isophorone	285 cps.
20% VAGH	Pent-Oxone	500 cps.
	cyclohexanone	320 cps.
	isophorone	405 cps.

With VAGH/Pent-Oxone solvent, viscosities rise with time. This can be overcome by using 50/50 Pent-Oxone solvent/cyclohexanone as the active solvent. Such a mixture would save you 55¢ per gallon against using cyclohexanone alone.

Better odor, lower cost, many uses

The price of Pent-Oxone is 17.5¢ per pound delivered in tank cars. It can tolerate up to 70% diluent in vinyl chloride/vinyl acetate copolymer solutions. It has a better odor than other vinyl solvents and is proving valuable in vinyl adhesives as well as acrylic lacquer thinners.

In nitrocellulose lacquers, Pent-Oxone retards blush, dries in reasonable time. It acts as a coupling agent in sludge removing compounds.

Complete data and samples

For samples and information, including complete graphs on viscosity and evaporation, write or call any of Shell's 9 Industrial Chemicals Division offices, or write Shell Chemical Co., 110 W. 51 St., New York 20, N. Y.

Do it today. Start investigating Pent-Oxone's remarkable keto-ether action for yourself.

*Trade mark, Shell Chemical Company
**Trade mark, Union Carbide Corp.

A Bulletin from

Shell Chemical Company

SHELL

Industrial Chemicals Division

Business
Newsletter

CHEMICAL WEEK
March 4, 1961

Another big acetylene user is going basic. Du Pont will build a new unit at Montague, Mich., to supply acetylene—"more than 50 million lbs./year"—for its neoprene plant there. The multimillion-dollar unit—scheduled for completion early in '63—will use a Du Pont "modified arc technique" (on which Du Pont has applied for patents) for producing acetylene by partial oxidation of "low-cost hydrocarbons"—either natural gas or liquids. (A natural gas pipeline runs into Montague, and other petroleum products could be obtained from refineries in Muskegon, about 15 miles south of Montague.) If this project turns out as well as Du Pont expects, it will probably mean the closing of Union Carbide's acetylene-generating plant at Montague and loss of the biggest single source of business for Carbide's calcium carbide plant near Sault Ste. Marie. But Du Pont will continue to buy acetylene from Union Carbide at Memphis and Niagara Falls, and from Air Reducation at Louisville.

•

Indications are that the Federal Trade Commission's action against union Carbide's ownership of Visking will not spearhead a drive against other resin producers with captive film operations (all major PE makers except Spencer, Monsanto and Eastman). FTC examiner Abner E. Lipscomb ruled that the '56 merger between Carbide (with about 50% of the PE resin market) and Visking (whose share of the PE film market has dropped from 40.2% in '56 to 24.4% in '59) was a violation of the Clayton Act. It appears that FTC is not fighting forward integration per se, is primarily fighting Carbide's size relative to the industry. The acquisition, the FTC says, allowed Carbide to dominate the market, set prices.

Lipscomb ruled that Carbide must divest itself of Visking's film-making units, but can keep its plants for making sausage casings. Carbide will appeal the decision to the commission, continue business as usual while the case is pending.

•

Latest operating statements show few ups and many downs in '60, with everybody looking for a brighter '61. Olin Mathieson's sales dipped 1.8, to $689.6 million, and earnings dropped 7.8% to $34.7 million; but the company's aluminum operations got out of the red ink during the fourth quarter. Commercial Solvents, on the other hand, scored a 70% rise in earnings, to $4.8 million, on sales of $62.3 million, down 11%. Michigan Chemical—pumping money into its new magnesia and pharmaceutical operations—came out with a net loss of $116,000 on sales of $8.5 million, down 2%.

•

Nevertheless, the industry is stepping up its investments. The latest annual construction survey by the Manufacturing Chemists' Assn.—out this week—shows '60-'62 outlays by U.S. chemical companies totaling $3.55 billion, up 15% from the '59-'61 total. Cost of new projects

planned for early groundbreaking and completion within two years is up 59.1%, to $772.4 million; cost of projects under construction is up 48.2%, to $1,737.4 million. New investments in general organic chemicals are up more than three-fold to $407.6 million.

•

India has apparently decided who will build the 350,000 tons/-year fertilizer plant at Vizagapatam, in Andhra state. The government has granted a license to Parry & Co. of Madras (India's largest private fertilizer company), International Minerals & Chemical Corp. and California Chemical (San Francisco) for the proposed $55-million plant, which is to draw its raw materials from the nearby Caltex refinery. Several U.S. companies, including Koppers, Kaiser Engineering, and International Agricultural Corp., have been dickering with the Indian government on this and several other proposed projects. With the license in hand, IMC and Cal Chemical will conduct complete feasibility studies and further negotiations with the government before making a final decision on their participation. The plant has been slated to turn out 200,000 tons/year of ammonium phosphate and 150,000 tons of ammonium sulphate.

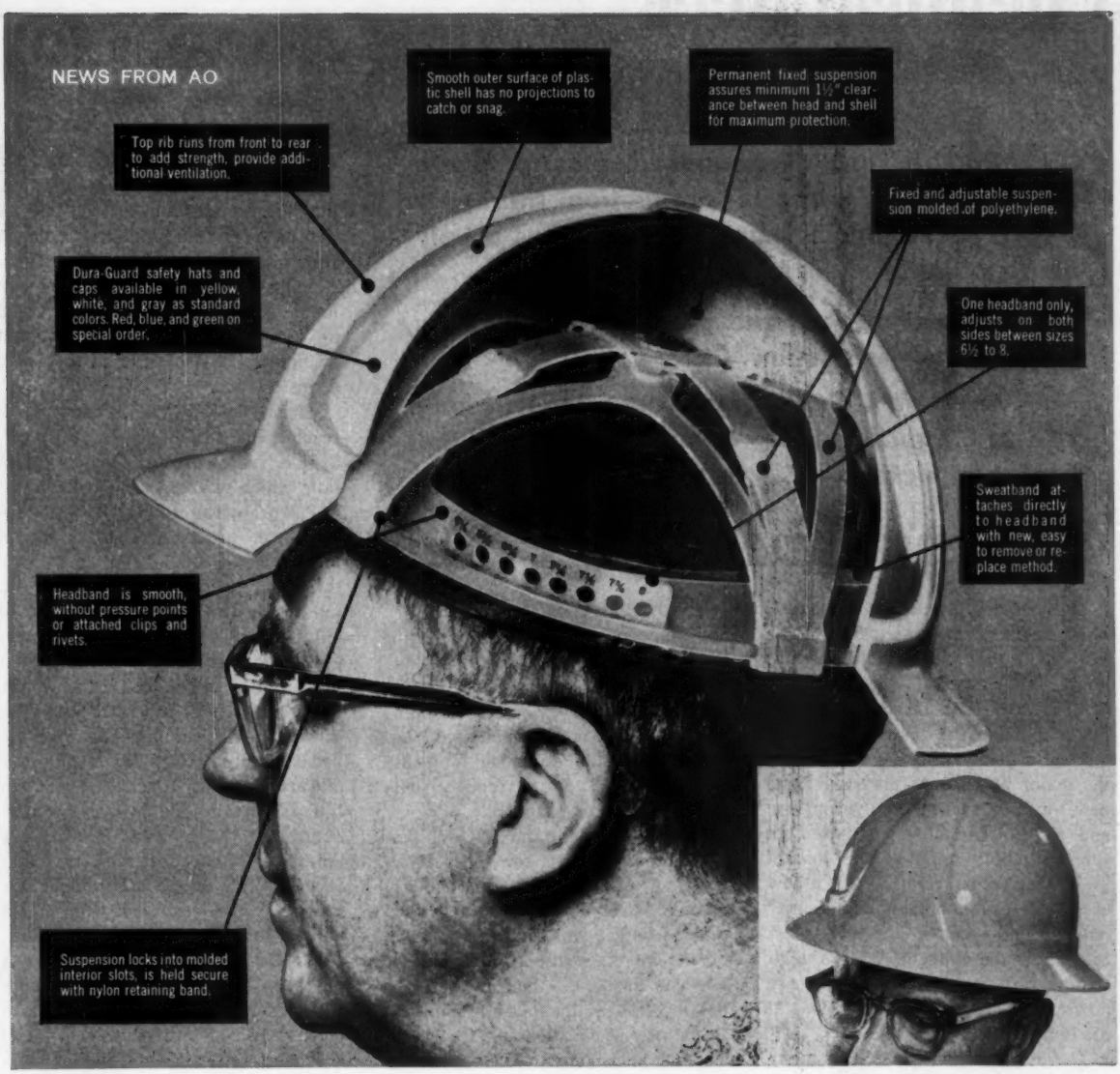
More Indian petrochemical projects are in the works. Phillips Petroleum, which is already building India's first carbon black plant at Durgapur, and Duncan Brothers (Calcutta) have reportedly won government approval for a polyethylene and cis-4 synthetic rubber plant. And Esso has expressed interest in building a steam cracker.

•

In Israel, a petrochemical complex will be built by a group of Israeli, Brazilian, and U.S. interests to produce 15,000 tons/year ethylene, 6,000 tons polyethylene, carbon black and detergent alkylate. Negotiations for engineering are still in progress, but the plant is expected onstream late next year or in early '63. U.S. backers include Max Fischer, chairman of Aurora Gasolene Co. (Detroit), and Sonneborn associates Petroleum Corp. (Sonapco), holding company of the Israeli petroleum distributor, Sonol. Co. Sonapco's interest has led to published reports that Witco Chemical was involved in the project through its wholly owned subsidiary, Sonneborn Chemical & Refining Corp. Witco denies any tie-up in the project. Members of the Sonneborn family held interests in both Sonapco and Sonneborn Chemical until Witco bought out the latter last summer.

•

Imperial Chemical Industries has more projects underway. At its Hillhouse works, near Blackpool, ICI is building a new plant to expand polyvinyl chloride capacity there by more than 40%, to 115,000 long tons/year, by '63. At Billingham, County Durham, ICI's heavy organic chemicals division is building a general-purpose pilot plant to handle most of the chemicals planned for development during the next few years. And at Macclesfield, Cheshire, ICI will build a $28-million plant, slated for completion in five years to centralize pharmaceutical compounding and packaging.



Now: one safety hat to meet all requirements

Introducing the AO Dura-Guard . . . an *all-new* safety hat designed for *universal use*. Shells and suspensions are molded plastic, without holes or metal parts. New Dura-Guard hats and caps meet or exceed all standard specifications, and *every* Dura-Guard may be used wherever dielectric protection is required. Dielectric strength in accordance with E. E. I. specifications (April 1954) is available in individually tested hats and caps.

The injection molded shell is of uniform thickness throughout critical areas. Plastic suspension and headband are lightweight, comfortable, long-wearing, nonconductive, easy to clean. Headband adjusts on *both* sides to stay centered in shell, eliminate floating. Sweatband can easily be slipped out for cleaning *without removing any other part*, is made in telescoping halves for comfort and economy. Front half, which tends to soil or wear first, can be replaced at minimum cost.

For full information, contact your AO Safety Products Representative, or write for Folder S-1456.

Your Surest Protection . . . AO SURE-GUARD Products

American Optical
COMPANY

SAFETY PRODUCTS DIVISION • SOUTHBRIDGE, MASSACHUSETTS

Polyolefins will account for most of the increase in U.S. plastics production this year. Watch packaging, in particular, grow as a polyolefin outlet.

Other large-volume plastics—e.g., vinyls, polystyrene—will show little gain.

Over-all, U.S. plastics production will jump 9%, to 6.5 million lbs.—assuming a second-half business pickup.

Olefins Lead the Pack

Over-all '61 plastics production is now expected to reach 6.5 billion lbs.—more than half a billion pounds above the '60 total. The questions: Will it all be sold? And which plastics will make the sales gains?

New capacity is being built in all the major plastics. At the same time, new plastics such as polypropylene and the polyformaldehyde types are sure to nibble some of the market away from older resins. With a few exceptions—most notably high-density polyethylene—there's apparent overcapacity at the moment. Sales in polystyrene and polyvinyl chloride are moving no faster than the general economy, if at all.

The major hope expressed by many plastics makers is that an expected upturn in the economy during the second half will bring plastics market increases. A problem faced by many is the question of where the upturn will show. If it comes through government pump priming, the initial increase will be in such things as heavy construction and military materials. These use considerably smaller amounts of plastics than do normal consumer purchases of autos, appliances, homes, and packaged products.

Betting on Housing: As one polyvinyl chloride maker puts it: "We just hope that what we lose in automobiles, we'll make up in home construction." He was referring to the possibility that part of the pump priming will be in liberalized Federal Housing Administration interest rates, increased public-supported housing.

Home construction and packaging emerge as the bright hopes of plastics makers today. Nearly every plastics maker has his eyes on the building industry; large-scale switches to plastics there would do much to justify all of the PVC and styrene capacity now installed or planned.

A fast moving trend toward plastics in packaging is the other most-heard justification — particularly among makers of polyolefins. Blow-molded bottles will account for much of the increased use of linear polyethylene this year—the most substantial increase in the plastics industry. Other new applications — frequently meaning packaging products that have never been packaged before—can also help out sales of the styrenes and vinyls.

Polyolefins on the Rise: Of all the major plastics, linear polyethylene is currently in the best shape. Producers say they can sell all they can make. Hercules Powder, busily supplying the booming detergent market and looking forward to what it hopes will soon be the booming bleach market, can hardly wait until it finishes its Lake Charles, La., polypropylene plant—which will permit the company to devote most of its Parlin, N.J., plant to linear polyethylene.

Both linear polyethylene and polypropylene are expected to move ahead rapidly during the coming year — polyethylene primarily in blow-molded bottles and in films; polypropylene in a wide variety of applications, but particularly in film and injection-molding. By virtue of its age, and the number of people promoting it, linear will score bigger gains; but an indication of relative real strength is seen in the fact that Hercules is expected to turn out equal amounts—about 45 million lbs.—of each of these two resins this year.

Linear polyethylene is expected to reach about 285 million lbs. this year, a 58% increase over '60's consumption, which was 183 million lbs.

Polypropylene to Triple: Polypropylene is just getting onstream in most places, should go up nearly three-fold to reach 100 million lbs. in '61, against 30-40 million lbs. in '60. One polypropylene seller, however, sees it going only to 59 million lbs. in '61; others peg it at somewhere between 80 and 100 million lbs. Where it will end up this year depends largely on how fast the various makers can get organized, get into full production, and handle the marketing. At the moment, applications are ahead of capacity, must frequently wait until a supply is assured. Texas Eastman, just onstream with a 25-million lbs./year plant at Longview, Tex. (*CW, Feb. 25, p. 23*), says it has been approached by three other PP producers interested in buying to meet their own orders.

Placing sales of conventional polyethylene for this year depends on where you draw the line on middle grades. Estimates vary from 800 million lbs. to 1.2 billion lbs. If you take a figure of 1.5 billion lbs. for all polyethylene, you have 1.31 billion lbs. left for low- and medium-densities after deducting the linear.

Vigor in Vinyls: PVC price has officially been stabilized at 18¢/lb., although there are still reports of price-cutting. Low profits have forced cutbacks on research funds both here and in polystyrene, so fewer new applications have been found. Total vinyl compound sales will be about 1.25 billion this year, up about 9% from about 1.15 billion lbs. in '60.

PVC is the plastic that finds most of its cheer and consolation in hopes

of a big future in the building trades. PVC already has many homebuilding applications, and a spurt in construction would appreciably increase sales. The big anticipation, however, is for many more structural applications—applications that are mainly awaiting changes in attitudes of building code setters and labor.

PVC also has many applications in autos and makers of the plastic are saddened by what now appears to be a disappointing year in Detroit. Plastics as a whole should sell more to auto makers this year—regardless of lower auto sales—because of fast-increasing applications. But these largely involve some of the newer plastics, e.g., polypropylene.

Polystyrene Up Slightly: Polystyrene molding compounds are expected to have about the same sort of year as they had in '59, which means they will be up slightly from '60. Total styrene resin sales should be about 1.1 billion lbs. this year, up about 10% from '60's 1 billion lbs. Polystyrene molding compounds should hit about 700 million lbs. in '61, up about 5% from '60's 665 million lbs.

Polystyrene is suffering severely from overcapacity, low prices, and low sales by the appliance industry —a major customer. Prices are reportedly so low, thanks to price-cutting, that in many instances makers are reluctant to fill orders: they'd prefer to keep stocks in inventory in hopes of a better price later.

Other lower-volume and higher-priced specialty plastics, such as nylon, are faring better. Nylon is expected to reach 33 million lbs. in '61, up 32% from '60's estimated 25 million lbs. Some old warhorses are declining with the economy or, like phenolics, faster. Phenolics will be down nearly 2%, from '60's 570 million lbs. to '61's anticipated 560 million lbs.

Generally, plastics makers expect this year's slow situations to be temporary, and are expanding in all fields. They expect the economy to swing up again, and for plastics to continue to make new inroads against metals, wood and other materials.

Traffic on the Merger Trail

Traffic was heavy along the merger trail this week. Many CPI companies were heading toward mergers, and one pair of companies—Minnesota Mining & Mfg. and Warner-Lambert Pharmaceutical — were in full retreat from their proposed unification. Throughout industry, management men were striving to find some guidance on new antitrust enforcement policy.

Newest merger scheme involves Industrial Rayon Corp. and Midland-Ross Corp., both of Cleveland. IRC —whose fading business in rayon fibers resulted in a nine-month net loss of $2.4 million last year—had sought to acquire Texas Butadiene & Chemical Corp. last year; but that move was spiked by minority stockholders (*CW Business Newsletter, May 7, '60*). Midland-Ross—whose nine-month sales and earnings last year were up more than one-third to $90.9 million and $3.5 million, respectively—has put together a growing business in automotive and industrial equipment, including numerous items for CPI plants.

If the merger is ratified by stockholders of both companies in a special meeting late next month, two shares of M-R stock will be issued for each five shares of IRC stock; and IRC will operate as a division of M-R. Wade N. Harris will continue as president of M-R, and IRC President Frederick L. Bissinger will be elected as an M-R vice-president.

In another move, Commercial Solvents (New York) is acquiring four producers of veterinary vitamins: Stabilized Vitamins, Vitaron Chemical Mfg., and Astrol Products, all of Garfield, N.J.; and Iowa Nutrition (Clinton, Ia.)

Addressing New York security analysts last week, executives of National Distillers and Chemical (New York) and Bridgeport Brass (Bridgeport, Conn.) estimated that consolidation of the two companies' sales, warehousing and other operations would save several million dollars per year. They expressed particular optimism on use of NDC's plastics as coating for Bridgeport's metal products.

Warner-Lambert and 3M indicated that a main reason for calling off their merger plans was that there had been no word from the Justice Dept. on the companies' request for clearance. In view of the government's recent assent to an apparently similar kind of merger between Dow Chemical and Allied Laboratories, it seems that federal policy on mergers is still unpredictable.

IRC'S Bissinger, M-R's Harris: Welding two Cleveland firms together.

Du Pont Decision Due

Sometime this spring, the U.S. Supreme Court is expected to come up with a decision on whether Du Pont will have to dispose of its big holding —currently valued at about $2.5 billion—of General Motors stock. Oral arguments before the high court's justices last week in Washington sparked this latest phase of the nearly 12-year-old antitrust case, in which Du Pont's 23% interest in GM has been held to be a violation of the Clayton Act.

John L. Davis, arguing for the U.S. Dept. of Justice, called for full divestiture, insisting that the financial effects on stockholders should not be the primary consideration. But he cited evidence from the trial showing that 87% of Du Pont's stockholders own 1-100 shares apiece; and he asserted that for these shareholders divestiture would mean a capital gains tax of only $50.

Davis insisted that when Congress enacted the antimerger law, it intended that a violation should be remedied by divestiture.

Du Pont attorney Hugh B. Cox declared that divestiture is not the customary remedy for a Clayton Act violation; that the lower court's decree effectively cuts off all possible Du Pont domination of GM's purchasing operations; and that divestiture would put an unfair burden on stockholders of both Du Pont and GM. He told the court that the government wants a "dramatic, ceremonial and symbolic" decree; and he pleaded that "injury to stockholders not be justified by ceremony."

Cox discussed three possible methods for disposing of the GM stock. He estimated that outright sale of the GM shares at their present value would incur total capital gains tax of about $600 million. There can be no legitimate objection to payment of a capital gains tax when a stockholder voluntarily sells stock, the lawyer stated, but a shareholder who is forced to sell has a rightful complaint.

He said distribution of the GM shares to Du Pont stockholders—in addition to regular cash dividends, or in lieu of all or part of cash dividends —would result in a substantial depression of the market value of GM stock. One other possibility cited by Cox: exchanging the GM stock for Du Pont shares.

Sinclair's Jeffries: Banking on chemicals for bigger profit gains.

Sold on Petrochemicals

Sinclair Oil Corp. (New York) is planning to continue its growth in petrochemicals "at an accelerating rate," company officers declared last week in an appearance before New York security analysts.

Finance Committee Chairman Harry Jeffries said that while petrochemical operations made very little contribution to company profits in '59, the situation changed radically last year as several new chemical units came onstream. As a result, he declared, 8-10% of '60 earnings are attributable to petrochemicals. This suggests that while petrochemicals accounted for nearly $5 million of the $52.5 million net income, they accounted for only about 5% of the company's nearly $1 billion sales and other operating revenues.

The company's chemical business is expected to surge again this summer when Sinclair-Koppers Chemical Co. —owned 50-50 by Sinclair and Koppers Co. (Pittsburgh)—brings its 70-million lbs./year styrene plant onstream near Houston, Tex. At its various refineries, Sinclair now produces toluene, xylenes, sulfur, and plastics-grade propylene; and its 45%-owned affiliate, Calumet Nitrogen Products Co. (Hammond, Ind.), produces anhydrous ammonia and ammonium nitrate. (Sinclair is rumored to be interested in isophthalic acid; see p. 63.)

James E. Dyer—vice-chairman of Sinclair's board of directors—said the company is stepping up its research program, which includes a petrochemical development unit at Harvey, Ill.

Steel Begets Chemicals

Steel mill expansion by Bethlehem Steel Co. at its Sparrows Point, Md., works will lead to substantially increased availability of various chemicals and industrial gases for the CPI plants in the Baltimore area.

Bethlehem has awarded to Allied Chemical's Semet-Solvay Division a contract for a coal-tar distillation unit that will have the capacity to process more than 50 million gal./year of tar into crude naphthalene (more than 42 million lbs./year) and phenol, cresol and cresylic acids (6 million gal./year). First production is scheduled to reach the market late this year.

And to supply the steel mill's growing requirements for high purity gases, Air Products (Allentown, Pa.) is building a $6-million plant that will provide 350 tons/day of oxygen and 450 tons/day of nitrogen. This plant —to be owned and operated by Air Products—will increase by nine-fold the steel mill's present rate of oxygen use.

KEY CHANGES

Alexander M. White to board of directors, American Cyanamid Co. (New York).

Hugo Riemer to president; **James Gerstley** to vice-chairman of the board of directors, U. S. Borax & Chemical Corp. (Los Angeles).

H. W. Haight to executive vice-president; **Nelson Jones** to board of directors; **Forrest M. Darrough** to general counsel, Humble Oil & Refining Co. (Houston).

Dean P. Fite to vice-president, Proctor & Gamble Co. (Cincinnati).

William Wood Prince to chairman of the board and chief executive officer; **Edward W. Wilson** to president, Armour and Co. (Chicago).

Ernest H. Peabody to chairman of the board; **Eric G. Peterson** to president, Peabody Engineering Corp. (New York).

Leland I. Doan to the board of directors, The Bendix Corp. (Detroit).

Thomas M. Rauch to board of directors, Smith, Kline & French Laboratories (Philadelphia).

European Merger Urge

A union between the six nations of the European Economic Community and the seven of the European Free Trade Assn.—long-talked about but still apparently as far away as ever—may move a little closer to reality as a result of talks in London this week between French and British experts.

They will explore the technical problems involved in bridging the Six-Seven gap. No one is expecting the meetings to produce a miraculous solution to the problem, which has been vexing political leaders of the West and worrying businessmen in both camps.

But—since this is the first time the British have actually got the French to sit down to detailed discussions since the collapse of the Free Trade Area negotiations two years ago—the talks may produce more than the nods and curtsies that have been going on across the widening trade gap since the end of '58.

Tension Within: The path toward whatever modest success the London talks achieve may have been eased by meetings held by both groups during the past few weeks: first, the Paris meeting of the EEC heads of government, then the Ministerial meeting of EFTA countries in Geneva. Neither meeting came up with concrete moves towards unity, but both may have indirectly furthered it.

The leaders of the Six and their foreign ministers met to thrash out Gen. De Gaulle's plan for a political confederation of the Six—the means, many observers believe, by which De Gaulle hopes France will play a leading role in the World.

The meeting produced little concrete results but it revealed the intensity of opposition within the EEC to De Gaulle's plan. The loudest opposition came from Dutch Foreign Minister Luns. The Dutch want Britain in the Common Market for economic reasons, and as a political counterweight to France.

Under the original Common Market concept of political integration, the Dutch argue, it was fair to exclude Britain, which is not prepared to go that far. But since De Gaulle's plan would remove this political aspect of the Six, there can be no longer a valid objection to including Britain or any other nation in the plans, Luns argued.

UPI

France's DeGaulle faces opposition within EEC to confederation plan.

France is still less than enthusiastic toward including Britain in the EEC. But as a result of Luns' objections, and West Germany's Adenauer's fears over Allied unity, De Gaulle's plans were watered down and action stalled off. And, in vague terms, the door was left ajar for Britain.

At the Geneva meeting, the EFTA members agreed to accelerate their internal tariff cutting schedule, moving up the slated 10% cut from Jan. 1 '62 to July 1 '60. This will produce a total 30% cut, helping an eventual meshing with the Six, who have also cut tariffs by 30%. (The Seven also paved the way for including Finland in a special status.)

Many observers believe the ultimate solution will be found within the new Organization for Economic Cooperation and Development. This might be able to work out some kind of customs union between the two blocs while protecting the U.S. from undue discrimination.

Meanwhile, business pressure within EFTA for union with the Six continues to mount. The plastics industries of the Outer Seven, for example, are working out a common policy to present to their governments on internal tariffs and a future link with the Common Market.

Last week in London they set up a policy committee to reach a unified view on tariff cuts and trade with the EEC and the U.S. The British Plastics Federation is pushing for a Six-Seven link, believes the industry within EFTA must be rationalized to meet the EEC's competition when the union finally comes.

Pull-up for Pemex

Pemex, the Mexican national petroleum company, has been ordered by the Mexican government to sharply curtail its spending and expansion plans for '61.

The move came after hushed but heavy criticism within the government of Pemex's locomotive-paced expansion, particularly last year. The company reportedly produced so much crude oil that storage and refining facilities were inadequate. Moreover, bottlenecks have developed in local equipment-producing plants, which are now reported behind schedule by about two months.

Some planned petrochemical projects will be chopped, at least for the first six months of '61, and probably for the entire year. When, or whether, Pemex will be allowed to resume its expansion is not certain. Nor is it clear yet how deeply the petrochemical plans will actually be affected.

Pemex officials contend the slowdown affects "certain small projects so unimportant they're not worth mentioning. . . . We have received specific credits for specific plants and they are not dependent on the national budget. There is no valid reason for stopping or slowing down the petrochemical program. This is going ahead exactly on schedule."

Reports from other sources give a much bleaker picture, however. These sources report construction plans have been suspended for the refinery at Ciudad Madero, where a string of petrochemical plants were to have been built, and that an ammonia plant at Minatitlan and other petrochemical projects at Mexico City, Salamanca, La Venta, and Poxa Rica have been held up.

Pemex funds were reported to be dangerously low after '60 outlays, a major factor in the cutback order. According to inside sources, the order to conserve money will affect not only plans for petrochemical facilities, but also projected natural gas pipelines and production in crude oil and natural gas fields.

Moreover, the Mexican government is believed to be taking a strong look at possible future loans to Pemex by foreign groups. Such loans, notably from U.S. banks, have been heavy in the past, and action may be taken to reduce this kind of financing.

national roundup

Rounding out the week's domestic news.

Companies

Spencer Chemical Co.'s (Kansas City, Mo.) newest corporate stockholder is Fisons Ltd., British chemical and fertilizer producer. Fisons—which was balked in its three latest acquisition attempts (*CW Business Newsletter, Jan. 21*)—has laid out about $3 million for purchase of 90,000 shares of Spencer common stock, giving Fisons an approximately 3.3% interest in the U.S. concern. The purchase included 75,000 shares of Spencer stock from the nearly 500,000-share holding of the estate of the late Kenneth A. Spencer, the founder and former chairman of the company.

This purchase reportedly makes it "extremely unlikely" that the Spencer estate will put any of its stock on the market in a secondary offering this year. Fisons already has west European marketing rights for Spencer's wild oats herbicide, Carbyne, and the stock purchase is expected to lead to a "closer relationship" between the two companies.

Petroleum Chemicals (New Orleans, La.) will move its main office from New Orleans to Lake Charles, across from its $80-million industrial plant complex.

Chemical Construction Corp. (New York), a wholly owned subsidiary of Electric Bond and Share Co., has moved its executive offices to 320 Park Ave. Chemico now occupies three floors of the new 33-story Uris Brothers Building.

Kaiser Aluminum & Chemical Corp. (Oakland, Calif.) is changing the name and status of two sales subsidiaries. Fire Brick Service Co. (Indianapolis) and Fire Brick Specialties Co. (Rock Island, Ill.) will drop their old names and operate as district sales offices of the Kaiser Refractories & Chemicals Division.

Expansion

Soda Ash: Allied Chemical is advancing its preparations for possible development of its trona deposits near Green River, Wyo., but says no immediate construction work is planned. The company has run surveys on labor supply, housing, state mining and tax laws, and other production factors. Allied is the fourth major chemical concern to plan ultimate trona production in the Green River area (*CW, Aug. 29, '59, p. 40*).

Butyl Rubber: Thiokol Chemical (Trenton, N.J.) and Cities Service Oil are still in the discussion stage on plans to build a butyl rubber plant. Total capital outlay could amount to $25 million, with Cities Service having the larger interest in the proposed plant.

Sulfur, LPG: Home Oil Co. (Calgary, Alta.) has applied for governmental clearance on a multi-million dollar expansion of its Carstairs gas plant. If approved, the enlarged plant is expected to be onstream late this year, with possible addition later on of units for recovering butane and propane. Sulfur recovery capacity: 15-20 tons/day. Estimated construction cost: $4.5 million.

foreign roundup

Rounding out the week's international news.

Investments/Ghana: In a move to attract foreign capital for her giant $560 million Volta River project, Ghana has granted sweeping concessions to an international partnership, set up to raise $280 million for Ghana's aluminum development. The Volta Aluminum Co.—Valco for short—is a blend of Kaiser Aluminum, Aluminum of Canada, Alcoa, Reynolds Metals and Olin Mathieson. Special exemptions from import and export duties are to go into effect, and Valco will be allowed to transfer profits out of Ghana.

Sales and Profits/Europe: Financial reports from three overseas firms show these '60 results:

- **Unilever Group's** profit margin fell in '60. There was an overall sales increase for the year, but a definite slowdown in the second half of the year. Combined sales rose to $5,171.6 million, a rise of $168 million over '59. However, all but $36.4 million of this rise was scored in the first six months. Combined net profits were down $23.52 million to $144.76 million.
- **Monsanto Ltd.'s** sales and profits hit a new high in '60, but earnings and profit margins fell sharply in the second half of last year. Sales: $58.24 million, up 12.5%. Profits: $3.92 million, up 6%. Exports remained at 35% of total sales.
- **Albright Wilson,** chemicals manufacturer, had a '60 profit of $6.8 million, slightly higher than '59.

LPG, Sulfur/Belgium: The Antwerp refinery of Societe Industrielle Belge, jointly owned by British Petroleum and Petrofina, will undergo a 2-year, $30,800,000 expansion. Expected onstream in '63, the new units will increase the potential output of liquefied petroleum gas, recover up to 60 tons/day of sulfur.

Drugs/Lebanon: Parke Davis International has applied to the Lebanese Ministry of Health for a license to set up a branch company in Beirut and drug warehousing facilities in Beirut's Free Zone.

Washington
Newsletter

CHEMICAL WEEK
March 4, 1961

A separate agency to control water pollution seems a good bet to win Congressional approval this year. The idea, proposed originally by Rep. John A. Blatnik (D., Minn.), got a big boost last week from President Kennedy in his natural resources message to Congress.

Kennedy and Blatnik differ slightly. The Congressman would create a new agency in the Department of Health, Education and Welfare and remove water pollution control from the Public Health Service. The President went along with the separate agency approach. But he would retain PHS control of the new unit. Blatnik is likely to agree.

Otherwise, the President threw the prestige of his office behind the Blatnik proposal. It would increase federal aid to communities for pollution control from the present $50 million to $125 million a year for 10 years. It also would increase the limit of aid to a single community project from the present $250,000 to $600,000.

Both Kennedy and Blatnik also want to broaden federal enforcement powers in pollution problems to include boundary and coastal waters and intrastate streams which flow into them. Federal action would be taken in such cases at the request of a community and with the approval of the state.

Control of air pollution over the nation's cities would be handled by the same separate agency, if the President has his way. This is not envisioned in the Blatnik bill. But Kennedy says the unit could provide new leadership, research, and financial and technical assistance for control of air pollution.

The President did not spell out his specific ideas on air pollution, but promised to do so when he submits legislation to Congress.

•

Doubling of federal saline research efforts also was recommended by Kennedy in his message. This is considered direct support for a bill sponsored by Sen. Clinton Anderson (D., N.M.), Francis Case (R., S.D.) and Sen. Clair Engle (D., Calif.).

The Senate measure, along with a similar one in the House, would extend the life of the Interior Department's Office of Saline Water for five years with a $20-million appropriation. Such a bill was passed by the Senate last year but died in the House. This year, its chances are considered excellent.

Five plants, each using a different saline conversion technique, now are in various stages of construction. The first at Freeport, Tex., using a multistage distillation process, is scheduled to begin operation in March.

Washington Newsletter

(Continued)

Industry participation in chemical warfare programs is being encouraged by the Defense Department. It already has let six contracts to private firms for chemical and biological research and development projects, and more are expected as the program evolves.

All the projects are, of course, top secret. Contracts awarded so far—ranging from $300,000 to $750,000—have gone to Mine Safety Appliances Co. (Pittsburgh); Melpar (Falls Church, Va.); Hazelton labs (Falls Church, Va.); Areojet-General Corp. (Downey, Calif.); Douglas Aircraft (Santa Monica, Calif.), and General Mills (Minneapolis).

Lt. Gen. Arthur G. Trudeau, Army chief of research and development, says private industry did not participate significantly in the chemical and biological program previously. Now, he adds, the program can be increased without a major boost in government personnel and facilities.

The program takes on added significance, says Trudeau, because of the apparent international stalemate in the nuclear weapons area. The prime contractors chosen so far are doing research in both defensive and offensive aspects of chemical and biological warfare.

•

The on-again, off-again shipment of grinding tools to Russia is off again (*CW Washington Newsletter, Feb. 25*). The proposed shipment was held up last week at the request of Sen. Thomas J. Dodd (D., Conn). He wants to give the Commerce Department time to study a report made by several experts for the Senate Internal Security Subcommittee. If the shipment finally is canceled, the possibility of chemical sales to Iron Curtain countries will go down the drain.

•

A new directory service covering food and color additives will be available Mar. 17 from Information for Industry, Inc. (Washington, D.C.) and Hazleton Laboratories, Inc. (Falls Church, Va.)

The two companies have joined forces to provide information on petitions, regulations, and extensions growing out of the Food Additives Amendment of 1958 and the Color Additive Amendments of 1960. Their Food and Color Additives Directory, initially to be published in five volumes, will contain the official actions of the FDA on some 3,500 food additive chemicals and about 135 color additives. Source of all information is the Federal Register.

Cost of the directory, covering actions between Sept. '58 and Jan. 31, '61, is set at $150, plus $150/year for monthly revisions

The new service is expected to be of aid to the food, drug, chemical, cosmetic, beverage and packaging industries. Next project for the companies: a similar directory covering cosmetics if and when Congress passes cosmetic pretesting legislation.

Have you investigated the unique properties of this stable, uniform acid? Perhaps your product or process could use the advantages available only from a non-volatile, solid dissolved in liquid, acid. Maas Phosphoric,—Food Grade, NF, Technical, Stock Feed Supplement and Phosphatic Fertilizer Solution.

A. R. MAAS CHEMICAL CO.

Division of Stauffer Chemical Company

4570 Ardine St., South Gate, Calif.

Telephone: LUdlow 8-2214

A ARM M

Stauffer CHEMICAL SINCE 1885

MAIL TODAY

A. R. Maas Chemical Co.
Division Stauffer Chemical Co.
4570 Ardine Street • South Gate, Calif.

Gentlemen: Please send me information on Maas Phosphoric Acid. My application is: _____

_____

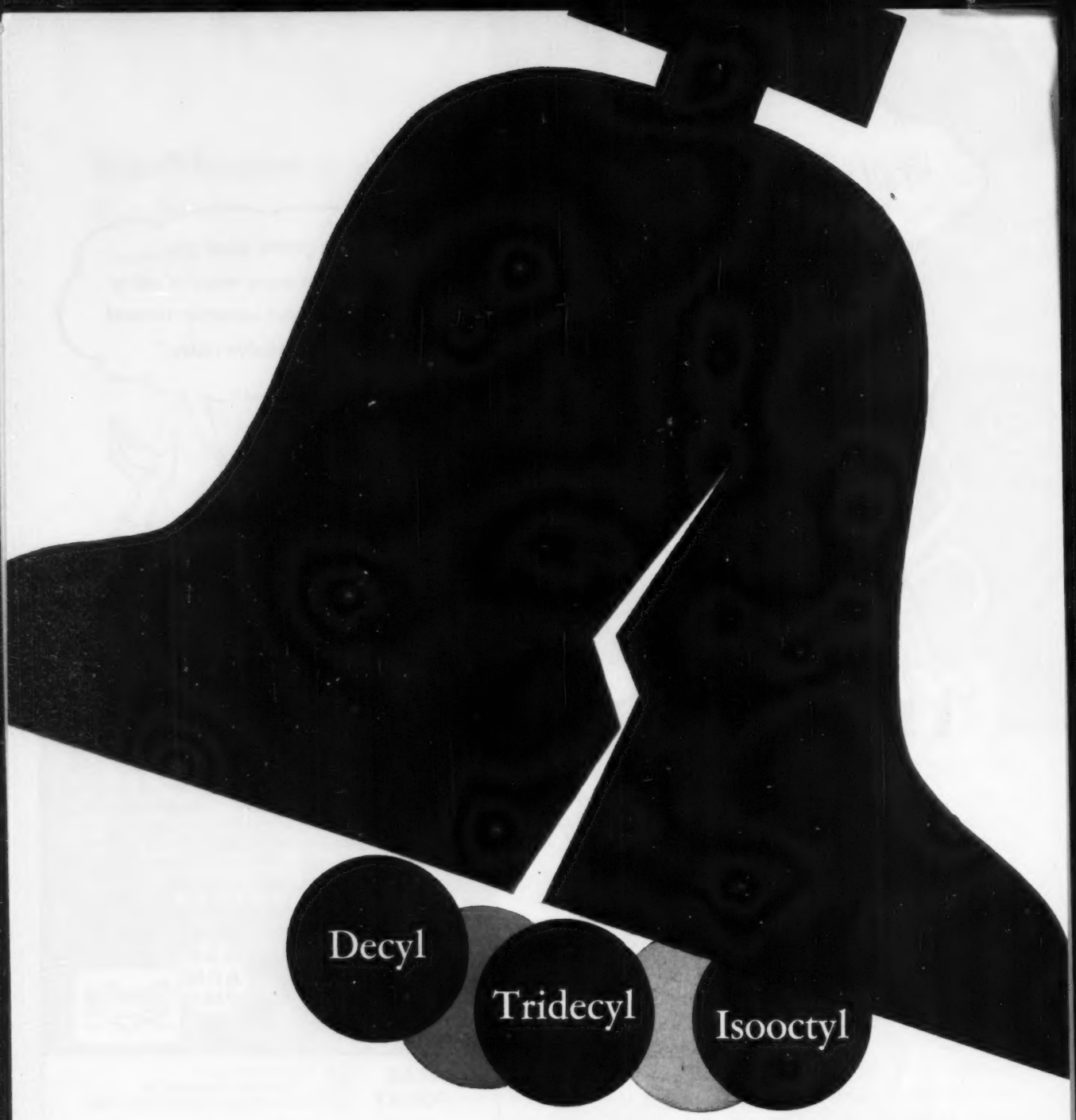
_____

NAME _____

COMPANY _____

ADDRESS _____

CITY _____ ZONE ____ STATE _____



Soon . . . oxo alcohols from Gulf's new plant at Philadelphia

When Gulf's new Philadelphia oxo plant goes on stream early this year, you will have a new source of *isooctyl, decyl and tridecyl* alcohols — today's key building blocks for vinyl plasticizers, detergents, synthetic lubricants and countless other exciting new products.

This facility was designed to produce all three of these oxo alcohols to standards that have made Gulf petrochemicals pacemakers in the industry. The plant's strategic location means faster deliveries to your doorstep . . . its capacity can supply your largest volume needs.

So, however you make or use any kind of alcohol-based product, you'll find Gulf's expanded oxo alcohol capacity much to your liking. You can get additional information at our Sales Office, 360 Lexington Ave., New York 17, New York.

GULF

Quality Petrochemicals to Begin with

Benzene • Cyclohexane • Ethylene • Oxo Alcohols • Propylene • Propylene Trimer and Tetramer • Sulfur • Toluene

Petrochemicals Department, Gulf Oil Corporation, Pittsburgh, Pennsylvania

This pump impeller . . .

Would cost:

	$425-540	**if fabricated by conventional methods**
more than	**$3,000***	**if cast as single item.**
less than	**$475†**	**if cast in lots of 10.**
less than	**$275†**	**if cast in lots of 25.**

*CW estimate based on probable die cost. †CW estimate.

New Deal for Titanium

A new titanium impeller for a centrifugal pump at Wyandotte Chemical Co. ordinarily wouldn't cause much excitement — Wyandotte already has four in service. But the fifth impeller just recently received is something special. It is the first commercial casting made by Titanium Metals Corp. of America's new process, called Impel Casting. And with it, TMCA is tendering a bold bid to develop a broad market in titanium castings for chemical process equipment.

If the bid pays off, it will mean less expensive process equipment parts: impellers, sleeves to protect impeller shafts, housings for small pumps, valve bodies and pipe fittings. For chemical firms—particularly those handling corrosive materials such as wet chlorine, nitric acid, sulfuric acid that has been inhibited (e.g., with metallic sulfates), urea, and sea water—it means that titanium parts may finally be justifiable on price.

As the estimated figures for a five-bladed, 10-in. diameter impeller (*left*) indicate, the cost can drop considerably below that obtainable by the usual fabricating technique, viz., shaping and welding blades to a machined impeller disc. It all depends on whether TMCA can cast in large quantities. And the price difference for the average chemical firm might be even greater because the fabrication costs shown are those obtained by Wyandotte, which has had considerably more experience with titanium than most companies. An inexperienced firm, without titanium savvy, might easily find itself paying $600 or more for a fabricated impeller.

Numbers Game: But to make its process equipment bid pay off, TMCA first must play a numbers game that is all too familiar to many titanium equipment sellers and buyers in the chemical industry. To offer parts at low cost it must develop a relatively large market — and to develop the market, it must offer the parts at low cost.

There is some question that a market for cast parts can be established. For example, Wisconsin Centrifugal Foundry was ready to cast parts in '57 but found that potential buyers turned either to forgings or to less expensive material substitutes instead (*CW, Apr. 13, '57, p. 27*).

At one time, at least five companies were interested in making titanium castings. Only Oregon Metallurgical Corp. (Albany, Ore.) followed through. Its largest contract (now finished) was with Boeing, but it has steadily sold small numbers of pump impellers. Working with Fabri-Valve (also of Albany, Ore.), it developed a valve that has had less success.

Yet, TMCA views its chances of building a market with "cautious optimism." Here's why:

Its casting process differs considerably from other forming techniques, has advantages for low-cost, large-volume production (*see Dimension, p. 30*). Although TMCA won't give details (it has applied for patents), it says it is using mild-steel molds that have the potential to turn out 100 parts. Conventional casting methods use one-shot, expendable graphite molds or machined-graphite molds which will turn out only a few parts.

TMCA's mold costs are high, but

unit cost drops quickly as the number of castings goes up. For example, one valve maker reports it can buy ten cast butterfly valves almost as cheaply as it can buy one. Although TMCA has not yet solved all the design problems for casting conventional valve bodies, the price of a 1-in. gate valve turned out in large quantities might someday be below $50—but that day is admittedly a long time off.

The number of parts TMCA will have to cast in order to match the prices of alternate forming techniques will depend on the type of part. For the first commercial item, the pump impeller, the break-even point with fabricating techniques was nine units.

Little Waste: In addition to gearing its process for volume production to cut mold costs, there is little waste with Impel Casting. It is essentially a die-casting process. The parts have good surface finish and appearance, can meet close dimensional tolerances. Once the material that filled the gate of the mold has been removed, the casting requires little or no machining.

In conventional expendable-mold casting, Oremet's yields after machining are only about 35% of the pouring weight. (Scrap is easily reworked, but adds to cost.) And Oremet admits that it may have to cast about eight parts to get five good ones. TMCA made just one unsatisfactory impeller —the first one, when it was still experimenting—out of a total of eight.

Oremet, however, doesn't look at TMCA as a potential competitor. The main reason: Oremet is not anxious to cast small parts, while TMCA is aiming for that kind of business. Oremet is capable of casting finished parts weighing about 150 lbs.; TMCA can only produce finished parts weighing 12 lbs. And Oremet says it can produce satisfactory parts with wall thicknesses up to 6 in.; TMCA can't produce sections thicker than ½ in. without porosity.

Porosity generally is not critical unless it affects the pressure tightness of a part—or its strength in the case of a part rotating at very high speed. (Porosity and other characteristics are part of a tentative standard for titanium castings presented at last fall's ASTM meeting. The standard is now out for membership vote.)

Porosity can be eliminated from critical areas by part redesign. TMCA hopes to be able to eliminate porosity in thicker sections with future development work.

Impel Casting has been in the development stage for two years. One difficulty in developing any titanium casting process: it must be done under vacuum because the metal is highly reactive toward nitrogen, oxygen and hydrogen at elevated temperatures, resulting in embrittlement and lower ductility. With steel molds, titanium's shrinkage rate (0.005 in./in.) makes timing a critical factor to prevent the metal from getting a death grip on mold and cores.

The metal must be fed at the proper rate to the mold. (TMCA won't say how this is done, but its term "Impel Casting" is descriptive of forcing the metal into the mold.) The casting must release easily when the mold is opened, and the cores must be pulled out of hollow parts. (Thus far, TMCA has been successful in pulling cores 12 in. long.)

During the first year of develop-

DIMENSION

How Titanium Forming Processes Compare

Forging—Parts are hammered into final shape from a billet of hot metal. Parts will have higher impact, tensile and compressive strengths than those made by other methods. Wall thickness of sections is heavier, surface finish and appearance are inferior to that obtained by die casting. Parts may be fairly complex, but cannot match the complexity of parts produced by other methods. Complex parts may have to be built up by fabrication techniques such as welding. Equipment, tooling and labor costs are high; part costs are low for high-volume items.

Powder metallurgy—Parts are pressed into a mold, then sintered at temperatures below melting point to get service strength about equivalent to that of plastic parts. Wall thickness of sections depends on design, may be quite small ($\frac{1}{16}$ in. or less). Surface appearance and finish are good; porosity may cause difficulties if parts must be plated or must be pressure-tight. Part size is limited by size of the press; and complex shapes—e.g., gears—may be achieved. Equipment, tool and labor costs are less than for other methods; part costs are low for high-volume items.

Casting with machined graphite molds—Parts are formed by pouring molten metal under vacuum into a mold that has been machined from graphite. Parts have high strength. Minimum wall thickness is about $\frac{3}{32}$ in. Surface finish and appearance are good, and contamination is low. Complexity of shape is limited. Molds are costly—life: 12 parts.

Casting with rammed graphite molds—Molds are formed using powdered graphite with binder (by a method similar to that for molds for sand casting). Molds must be fired, are used for one casting and discarded. Parts have high strength, can be somewhat more intricate than those cast from machined graphite, but carbon pickup is more likely. The mold has some porosity; surface finish and appearance of parts are not as good as with machined graphite. Porosity of parts is overcome by centrifugal casting (spinning the molds) and by proper design of risers. Minimum wall thickness of sections is $\frac{3}{32}$ in., maximum thickness about 6 in. Maximum pouring weight of castings is 425 lbs.; finished casting weight is about 35% of pouring weight. Parts are less costly than those made in machined-graphite molds.

Impel casting—Parts are made by forcing molten metal under vacuum into mild steel molds (i.e., a form of die casting as opposed to foundry casting of graphite-mold methods, above). Molds can be used for about 100 parts. The parts have high strength. Surface appearance and finish, and finished dimensions are better than those obtained by other methods (machining and grinding are usually unnecessary). Minimum wall thickness of sections is $\frac{1}{16}$ in. Porosity is not a problem in sections under ½-in. thick. Maximum casting weight: 12 lbs.

Gas reforming hits a new high Engineering news was made in France recently, when a Chemico high-pressure gas reform furnace operating at 250 psi was placed on stream. Prior to the completion of this project, no gas reformer in the world had ever operated at pressures above 175 psi. Design innovations incorporated in this plant reduce compression requirements and increase heat recovery.

This historic breakthrough in gas reforming is indicative of the skill and experience which Chemico brings to all process engineering problems. Chemico services to clients in the process industries range from initial laboratory research and testing to final construction and start-up. If you are interested in learning more about Chemico, write to "Department B".

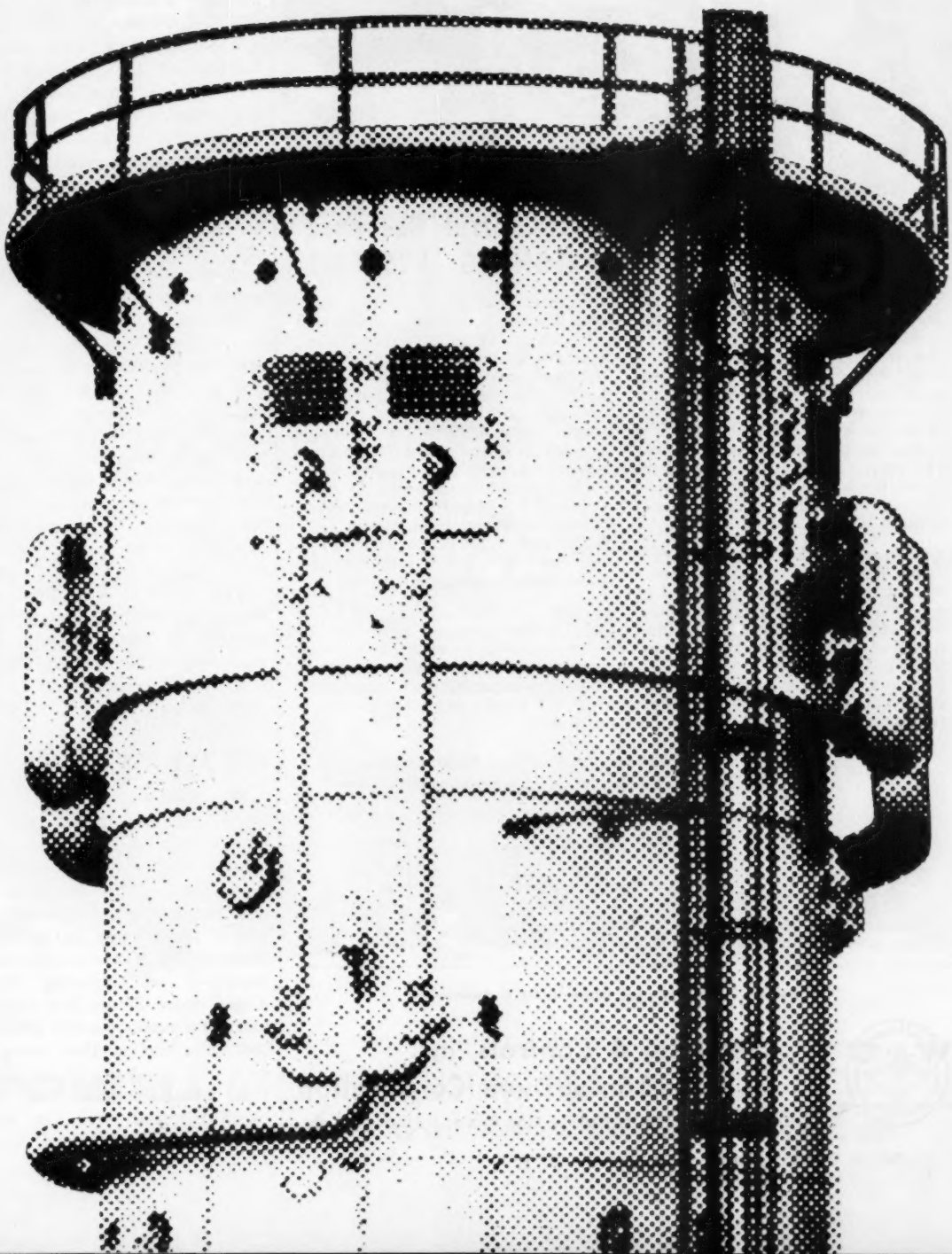
CHEMICO

CHEMICAL CONSTRUCTION CORPORATION

320 PARK AVENUE, NEW YORK 22, NEW YORK

CHICAGO/DALLAS/PORTLAND, ORE/TORONTO

LONDON / PARIS / JOHANNESBURG / TOKYO



ment, all operations were timed with a stop watch. Now timing is electronically controlled.

Switching Signals: One factor that should figure heavily in TMCA's market development is its shunning of military markets at the start. Titanium has traditionally first won applications in the aircraft area. But the demands of aircraft quality are so high that development costs can be pulled out of line. TMCA will cut its teeth on the less demanding chemical process industry, where it already has had considerable schooling and success.

It is eyeing three factors: the chemical industry buys standard, off-the-shelf parts in other specialty metals (e.g., stainless steel); castings provide a substantial share of the shapes in other nonferrous metals (e.g., 19% in aluminum, 23% in magnesium, 88% in zinc, 5% in copper); and a Battelle Memorial Institute report in '57 indicated that an economical casting method could take 10% of titanium sponge produced.

While some chemical companies report that they can use plastic parts, pipes and pipe linings for some applications, plastic will not meet service requirements in critical high-temperature processes. Some companies have shied away from titanium because pipe fittings now must be fabricated; and engineers are wary of welded elbows, tees, etc., for severe service.

A large-volume market will not develop fast. But TMCA has shown staying power in a hard-pressed industry, is operating at a profit. Its chances of winning the numbers game with titanium castings look good —and the chemical process industry stands to gain.

EQUIPMENT

Sifter-Cooler: For [illegible] installations where space and time are at a minimum, The Young Machinery Co. (Muncy, Pa.) offers the Gyro Cooler, a combination sifter and cooler. The unit has cooling coils on the under side of the flat pan that carries the product. The coils are accessible for inspection and cleaning through hinged doors. Screen and cooler arrangement makes possible sifting and cooling or cooling, then sifting.

•

3D TV: Stereotronics Corp. (1717 North Highland Ave., Los Angeles

LOOK TO POWELL VALVES

You can count on Powell Valves for the answer to virtually any flow control problem where corrosion, erosion, temperature, or pressure are encountered. Because, at Powell, you'll find the largest selection of valves for the chemical industry.

For instance, only Powell offers you such a wide selection of materials—both ferrous and non-ferrous. This includes Stainless Steel, Nickel, Monel*, Hastelloy#, Ni-resist* and aluminum, just to mention a few.

Powell Corrosion-Resistant Valves are also rated up to 2500 pounds W.P. and for temperatures up to 1000F. For complete information and the answer to your corrosion, temperature or pressure problem, contact your nearby Powell distributor or write us directly.

*Registered trade names of The International Nickel Company.

#Registered trade name of Haynes Stellite Company.

150-pound W.P. Tank Valve. For mounting to bottom or side of vessel. Fig. 2309, disc opens into tank. Fig. 2310, disc opens into valve. Sizes, ½" through 8". Supplied in stainless steel, Monel, Nickel and other alloys. Available on special order in other sizes and pressures.

150-pound Stainless Steel Globe Valve, Fig. 2429. Outside screw rising stem and yoke, bolted flanged bonnet, integral seat. Available only with flanged ends. Sizes, 4" through 12". Angle valves of this design can be supplied on special order.

150-pound Steam Jacketed Gate, Globe, Lift and Swing Check Valves, Fig. 2800. Made especially to control the flow of heavy viscous media that require a heated jacket to keep them fluid. Shown, a Stainless Steel Gate Valve available with guided interchangeable solid or split wedge and integral seats. Sizes, 1" through 4".

115th year of manufacturing industrial valves for the free world

POWELL CORROSION RESISTANT **VALVES**

THE WM. POWELL COMPANY CINCINNATI 22, OHIO

28) is marketing a kit that converts conventional closed-circuit television systems to third-dimensional viewing for handling radioactive and other dangerous materials, monitoring difficult production processes. Kit contains an optical device, called a Stereo-Captor, which is mounted on the lens of the camera. A transparent stereo screen is installed in front of the receiver. Viewers wear stereo glasses.

•

Aluminum Jacketing: Premetco's (P. O. Box 1134, Shreveport, La.) new aluminum jacketing is self-locking, can be installed on insulated lines with little labor and without special tools. The jacketing is precut and has rolled ends. A Z-crimp along one edge of the jacketing is interlocked with adjoining sections forming a water-tight seal. A 2-in. circumferential overlap provides for natural expansion without a separating joint. The jacketing's interior surface is moistureproofed with a 60-lb. natural kraft paper and 10-lb. polyethylene coating bonded to the aluminum.

•

Flow Transducer: Francisco Engineering Co. (23987 Ventura Blvd., Calabasas, Calif.) says its new turbine-type flow transducer is more accurate, has longer life than other turbine-type models. The transducer can be used to measure the flow of any liquid or gas, according to the company. When fluid moves through the pipe section, the transducer's rotor is hydrodynamically balanced between the unit's support and cone by a pressure feedback system that eliminates the need for thrust bearings. Nominal pressure drop is 4-6 in. of water.

•

Tubing Valve: Autoclave Engineers, Inc. (2915 West 22nd St., Erie, Pa.) is offering a new lightweight stainless-steel tubing valve for liquids and gases at 12,000 psi. The valve has large port openings, low pressure drop. Valves are installed with Ermeto-type sleeves, require no threading, swaging, flaring, welding or special tools. Sizes: ⅛- ¼- and ⅜-in. O.D. tubing.

•

Compressors: Atlas Copco, Inc. (545 Fifth Ave., New York 17) and Allis-Chalmers Manufacturing Co. (Milwaukee 1, Wis.) are marketing

SILICOLOGY *Studies in Silicones*

HOW THESE TIME-TESTED MATERIALS CAN WORK FOR YOU

Silicone Antifoams-Winning the Battle for Space in Many Processes

Foam is a "killer"—in many industrial and chemical processes. It kills costly space. It kills costly manhours. And it often limits process capacity. In latex production, food packing, paper production—almost any operation where liquids are pumped, handled, or aerated—foam is widely recognized as a primary operating problem.

To prevent or reduce foam, UNION CARBIDE supplies a complete line of silicones. These are growing in popularity because they work so well. The extremely surface active nature of silicones, along with their low compatibility with most fluids, enables them to rupture the bubble walls and cause quick break-up of foam. Silicones are so effective, in fact, that through their use the total cost-of-defoaming is usually reduced below that of competitive products. For your information, we review here a few of the more common UNION CARBIDE Silicone antifoams.

METHYL OIL BASE TYPES

The oldest known type of silicone defoamers is based on dimethylpolysiloxanes. These work extremely well in most aqueous systems; also in many organic systems, where reasonably high viscosity silicones are used. Reason for their success: *extremely low surface tension, in the neighborhood of 19-21 dynes per cm* (as compared with 27-28 d/cm for kerosene). The basic UNION CARBIDE commercial designation for this type is L-45.

Variations include SAG 47 Antifoam wherein fine silica and other agents are blended with silicone oils to produce an especially effective fluid for defoaming aqueous or non-aqueous systems. Another, SAG 470, offers a 10% Silicone emulsion for extremely easy dispersion in defoaming certain aqueous systems.

What do customers say? "L-45 plus a light oil cuts foam down in coker feed stock for 6-7 hours."... "SAG 47 much better than competitive products for defoaming our insecticides. Not as heavy and grease-like, therefore disperses more easily."... "Tested SAG 470 sample in water-emulsion wax. Worked satisfactorily." (Order was placed.)

SYNERGISTIC MIXTURES

Another weapon against foam: UNION CARBIDE's SAG 471, a mixture of organic defoamers and silicones. In systems where vigorous agitation is a particular problem (e.g. rubber latex handling) this new product excels; retains its effectiveness where others fail; does the job for two successive operations. It has proven particularly resistant to emulsification into the liquid phase—a factor known to take the fight out of most foam-killers.

One well-known customer reports solving a "nasty" foam problem using SAG 471 to defoam a process used in making organic lactone. Another, ball-milling rubber latex for carpet backing, found he could use as little as 7 pounds of SAG 471 per 35,000 lb. batch of latex, proving it more effective on cost-of-defoaming basis than other products.

TAILORED MOLECULES, AND OTHERS

More on these in future issues. Recently developed UNION CARBIDE products introduce new silicones with solubilities that vary to meet changing requirements such as temperature. Other special defoamers meet other special requirements. If UNION CARBIDE doesn't have the antifoam that suits your needs—we will invent it! Organic materials, conventional silicones, "tailored" molecules, others can be combined as required in our laboratories.

But we can't help you save space, time and money unless we know your problem. Why not write it in on the coupon and send today?

NEW TRIPLE-PURPOSE SILICONE FOR PAINT INDUSTRY

UNION CARBIDE Silicone R-12 is providing a three-way boon to paint manufacturers—as an economical antifoam, antiflood, and leveling agent for phenolic, alkyd, and urea formaldehyde enamels and lacquers.

Wide application has demonstrated excellent antifoam and foam preventive qualities, particularly during varnish cooking. R-12 eliminates fish-eyeing and cratering. It reduces roping and curtaining during storage of oleoresinous varnishes, with no ill effect on drying, coating or flooding properties of the finished vehicle.

UNION CARBIDE

SILICONES

UNION CARBIDE and SAG are registered trade marks of Union Carbide Corporation.

Silicones Division
Union Carbide Corporation
Dept. CC-4101
270 Park Avenue, New York 17, N. Y.

In Canada: **Union Carbide Canada Ltd., Bakelite Division, Toronto 12.**

Please send me data on _____

_____

NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ ZONE ____ STATE _____

newly designed compressors.

Atlas Copco's new, 30-hp air compressor for delivering 141 cfm. of air cuts foundation costs. It is mounted on rubber-bonded feet, has the advantage of a heavy-duty unit with the flexibility of a portable model. The compressor, called TT6, is a two-stage, single-acting unit with complete air cooling.

Allis-Chalmers has redesigned its Type VC intercooled centrifugal compressors for water cooling between all stages. The intercoolers are mounted after each impeller in the upper and lower half of the single, horizontally split casing. The units deliver 5,000-60,000 cfm. of 60-125-psi. air.

•

Tape Reader: A photoelectric tape reader with chopped reflected light is a new product of Borg-Warner's Omnitronics, Inc. (511 North Broad St., Philadelphia 23). Applications: tape reading of the input to digital computers, tape convertors and communication systems. The light-chopper wheel and ac-coupled amplifiers assure stability. The use of reflected light gives a better signal-to-noise ratio and greater reliability in reading translucent tapes, says Omnitronics.

•

Gas-Stream Sampler: Carad Corp. (3381 Junipero Serra, Palo Alto, Calif.) is turning out a new hydrocarbon gas sampling unit for use with its FIAD flame ionization analyzer and detector. The unit monitors and controls the flow of air, nitrogen and hydrogen for the FIAD unit, is said to be an efficient method of introducing sample gases for analysis. The unit, called the GAMAD, permits analysis of 20-40-cc. batch samples and continuous analysis of a gas stream from a pressurized source and gas-phase chromatograph.

•

Vapor Monitor: The Petroleum Instrument Co.'s (P. O. Box 66252, Houston, Tex.) new Peerless gas-vapor monitor system detects the presence of gasoline and other floating explosive chemicals in dock waters. Six station points at distances up to 650 ft. from the alarm-control point are tested every four minutes. Detection points are factory-set to sound an alarm when conditions reach 20% of the lowest explosive limit.

PENTON® COATINGS

A simple solution to your complex

CORROSION PROBLEMS

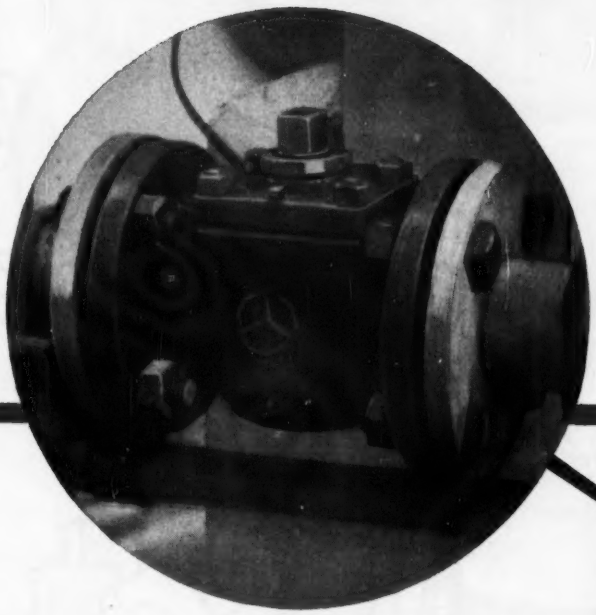
Though many corrosion problems may seem complex, a Penton coating can often supply a simple answer. Economically applied to low-cost metal substrates, Penton provides a tough, pinhole-free barrier against corrosion at elevated temperatures.

A typical example is this Penton-coated TUFLINE plug valve, successfully serving in the discharge and filling line of a 20-Baume muriatic acid installation where even expensive metals could not withstand the corrosive exposures involved.

Durable Penton coatings for valves, pipes and fittings, and pump and meter parts ranging in thickness from 10 to 40 mils, can be achieved by various techniques. They provide excellent protection against the corrosive attack of acids, alkalis and solvents, both to exterior surfaces and interior wetted parts.

Penton, chlorinated polyether, is a modern engineering material with an established record of success in combating today's toughest corrosion problems. Easy to mold or fabricate, it can serve as a coating or liner for metal, or be used in solid molded form.

Want to learn more about Penton? Write for your copies of "The ABC's of Penton for Corrosion Resistance," which cites data on Penton's chemical resistance to more than 300 reagents, and "The Penton Buyer's Guide," a complete listing of fabricators and suppliers of Penton processing equipment.



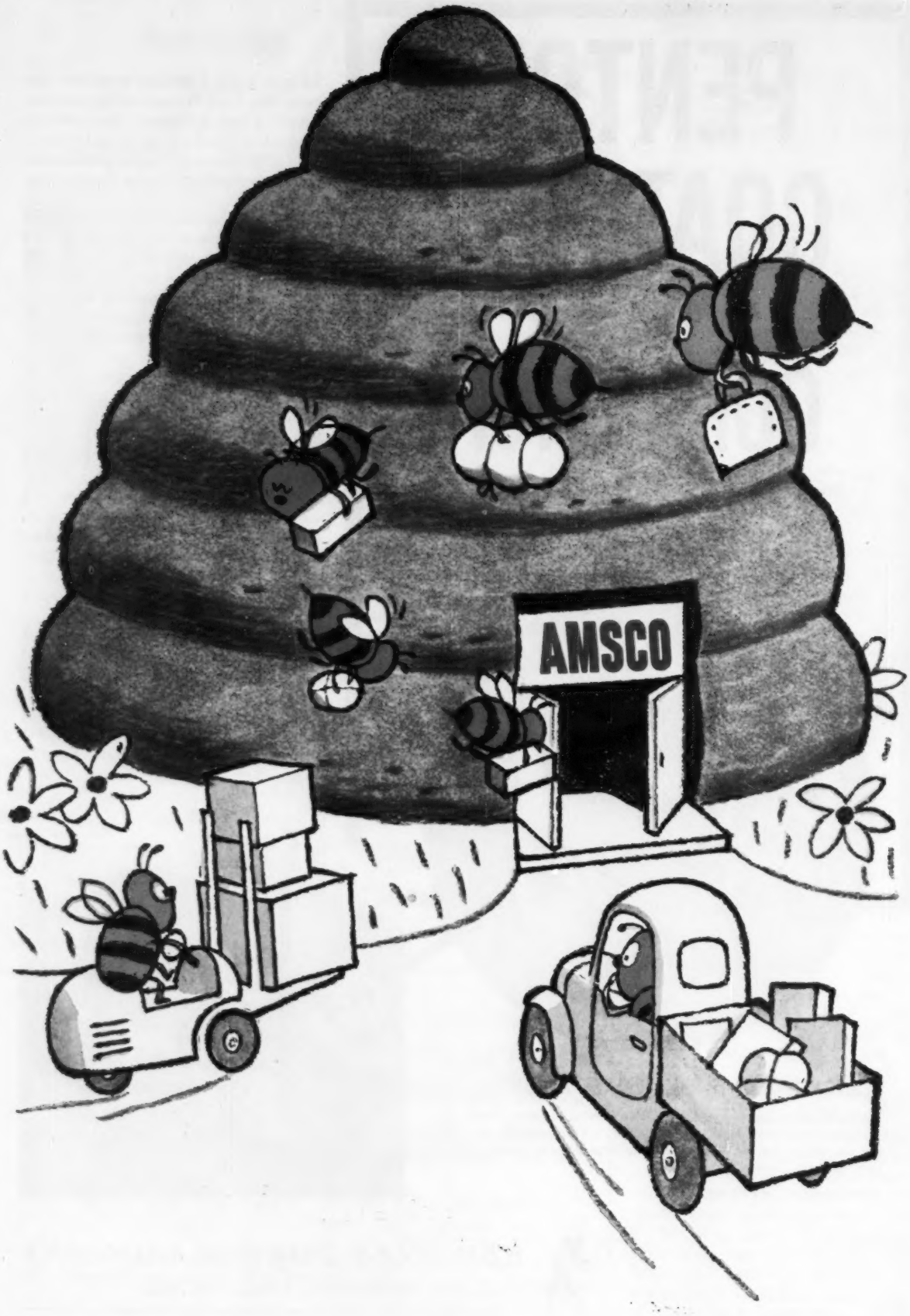
PENTON MAKES TUFLINE VALVES TOUGHER

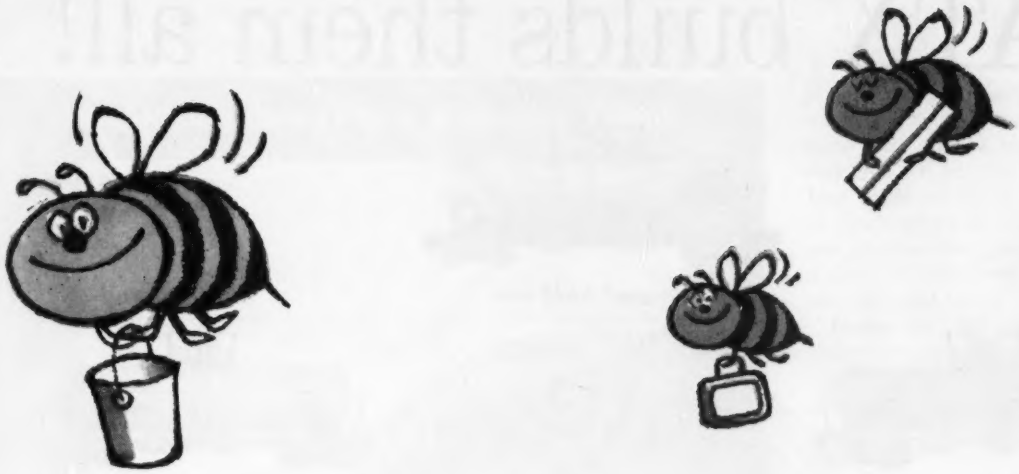
Tufline valves in sizes from ½" to 2" with a CORVEL*-Penton coating are made by Continental Manufacturing Company, Cincinnati, O. The coating was applied by the WHIRLCLAD* customs coating service of The Polymer Corp., Reading, Penn.

**Trademarks of The Polymer Corp.*

HERCULES POWDER COMPANY
INCORPORATED
Hercules Tower, 910 Market Street, Wilmington 99, Delaware

CP60-13


AMSCO



WAX PROBLEMS?

(even the bees come to us!)

Actually, it's a long time between bees in our reception room, but if you have a wax problem call AMSCO. We offer a complete source for paraffin and microcrystalline waxes, and our inventory is as near as your telephone. With AMSCO, one call does it . . . you get what you want, where you want it, when you want it.

SERVICE COAST-TO-COAST

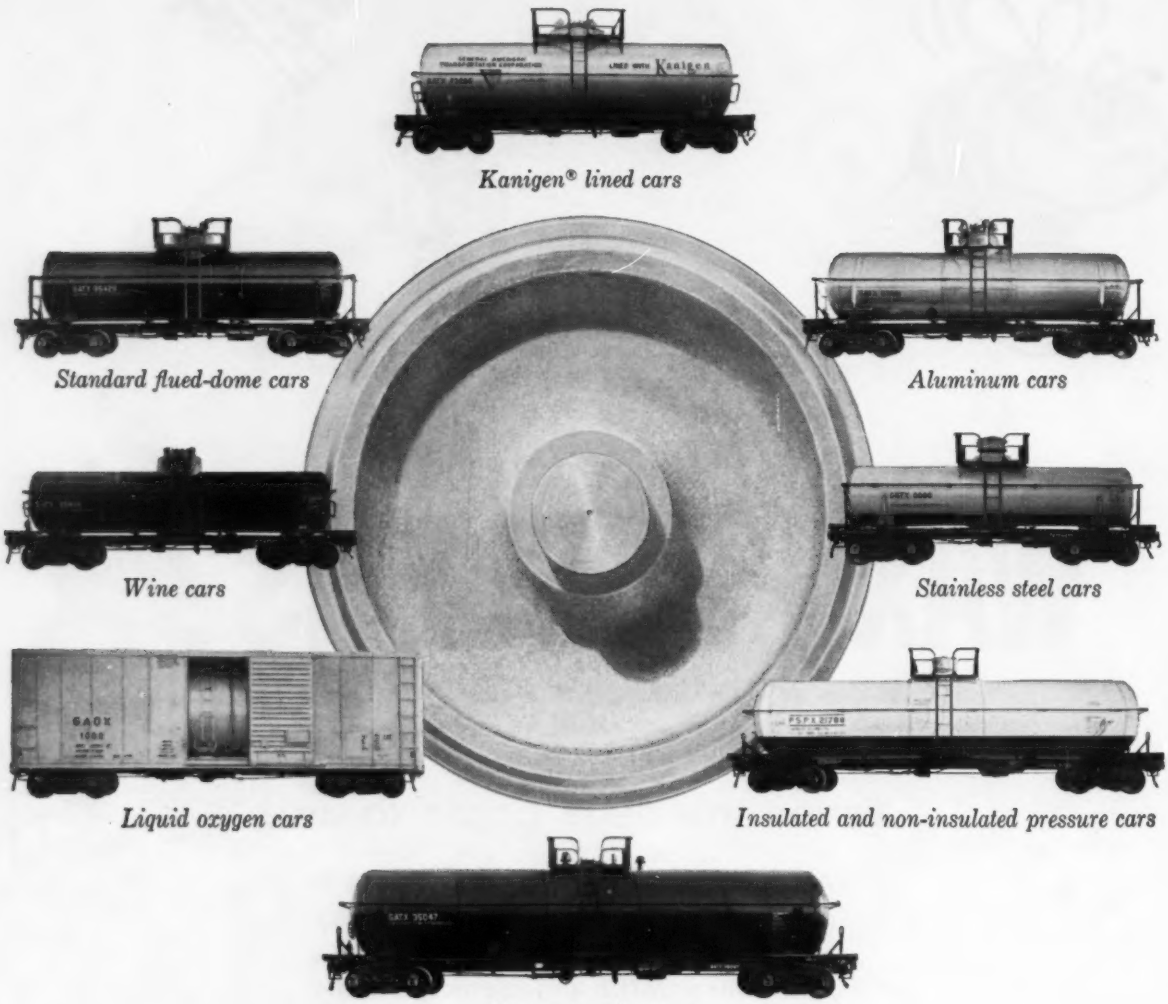
AMSCO

AMERICAN MINERAL SPIRITS CO.

NEW YORK
General Eastern Office
Murray Hill, N. J.

CHICAGO
200 South Michigan Ave.
Chicago 4, Illinois

GATX builds them all!



Kanigen® lined cars

Standard flued-dome cars

Aluminum cars

Wine cars

Stainless steel cars

Liquid oxygen cars

Insulated and non-insulated pressure cars

Large capacity cars

If your product is a liquid, GATX builds—or can build—a tank car to transport it; maintains a nation-wide network of shops for service and upkeep.

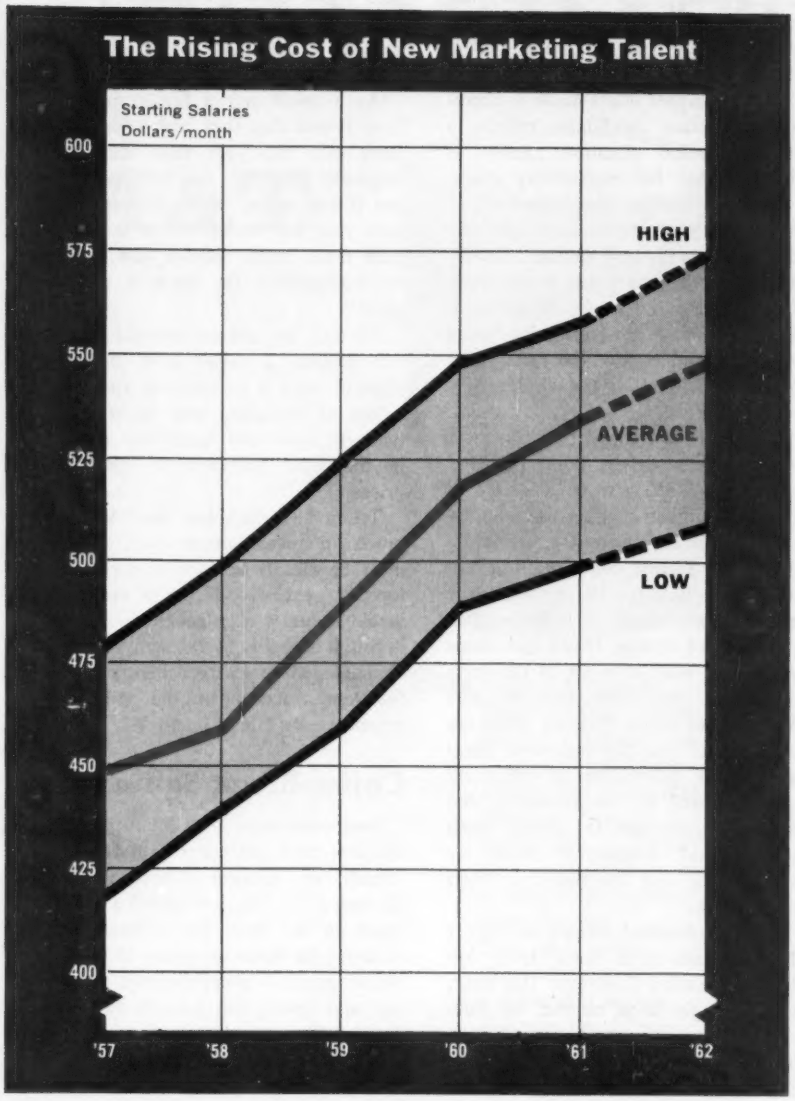
No capital investment . . . when you ship GATX!

Tank Car Division

GENERAL AMERICAN TRANSPORTATION CORPORATION

135 South LaSalle Street • Chicago 3, Illinois
Offices in principal cities

GATX GENERAL AMERICAN TRADE MARK



Recruiting Tab Rises Again

The annual spring rush by chemical process companies to recruit new sales and marketing talent from the colleges is near its peak. For the companies and for the June graduates, this year's activities mark one of the most paradoxical recruiting seasons in many years, combining many of the elements of boom-time '57 and '59 with the gloom of recession year '58. Despite the mixed circumstances, however, starting salaries will edge upward another 2-3% over last year's level (vs. the 5-6% annual rate increase of recent years)—setting new records on the way (*see chart above*).

One of the principal factors in the recruiting paradox was the wide divergence in companies' early plans for this year's recruitment campaign; some greatly expanded their recruiting efforts this year (such as Pennsalt Chemicals Corp.), while others cut back drastically.

But even more significant is the changeable behavior of recruiting participants (both companies and prospects among the graduates) during the campaign. Some companies have altered their original plans and others may yet do so. And many of the June grads reacted to the worsening of the recession by making their career choices early, rather than taking a flock of interviews while looking over the field, as in past years.

Plenty for All: As usual, most chemical company recruiters feel they won't land enough of the really top-caliber men for marketing positions. According to recruiters, many of the top students either elect to continue their studies in graduate school or else select positions in engineering, production or research. Despite this, most recruiters feel they will have little trouble filling all available marketing posts. Main reason: scaled-down recruitment quotas.

While some firms are looking for more new sales talent this year than previously, a CHEMICAL WEEK spot check reveals that many more are not. Main reason is the business slowdown.

Naturally, most companies' long-term needs aren't appreciably affected by the current downturn, but recruiting needs are considered to be expendable by many chemical management men and often suffers curtailment during bad times.

Peak Salaries: Salary offers to the new grads will be up about $10-15/month over last year's. While this follows a long-standing trend (only twice since World War II have average starting salaries not moved upward), it does represent a considerable slowdown in the starting wage spiral, from the '57-'60 average of 5-6%/year to this year's more moderate increase of 2-3% over last year's mark.

Chemical company recruiters report that at the low side of the scale they are offering $500-510/month to technically trained sales and marketing candidates; and up to $550/-month and even $570/month in rare instances to exceptional men. On the average, offers will range about the $530-540/month mark.

One nationwide recruitment survey*

* "Trends in the Employment of College and University Graduates in Business and Industry," conducted annually by Placement Director Frank Endicott at Northwestern University, Evanston, Ill.

indicates that starting salaries for all June graduates will be about $470/-month, with men going into sales getting offers of near the $450/-month level.

But the higher offers made to chemical marketing candidates reflects a supply/demand situation nearly as tight as that for engineering grads.

Money Worries: The higher salary offers this year are causing considerable concern among salary administrators, as they have for some years. Their fear: that the rise in offers to new men may outstrip gains made by older employees, generating discontent and upsetting the whole salary program.

But realistic recruiters, as shown by Endicott's survey, point out that this year's 2-3% rise is generally in line with higher salaries received by older employees during the past year.

Strange Twists: Now that the recruiting pattern for the current year is taking firm shape, it indicates that a number of strange twists and countercurrents were at work in the market. Most recruiters describe this year as "not much different from the last several." But this statement glosses over the contraction in recruiting quotas caused by the recession, the last-minute changes in quotas (both upward and downward) made by many firms, and the resulting effect on students.

Several chemical companies report that students have made their job decisions earlier than ever this year, a surprisingly large number by Feb. 1. One recruiter even termed it a "student panic" to pick the most attractive offer before looking over too wide a field. "Instead of the 10-15 job offers that many of last year's grads received, this year's student is lucky to turn up four or five," says one recruiter. "And he's not waiting around to see if others will come his way."

Some recruiters and college placement officials feel that this reaction is tapering off now, and they look for more casual scheduling of interviews and home-office visits during the balance of this term.

Outlook: Many recruiters see this spring's recruitment campaign coming to a successful conclusion: the chemical companies will land all the sales and marketing candidates they need; and all qualified graduates will find a place in industry. But next year could be a different story and see a return to the fierce days of industry competition for all types of graduates.

As a result not a few companies have hinted that they may take more good men this year than they had originally planned. As one recruiter put it last week: "Who knows what next year will bring? We're going to grab these better fellows now, while the competition for them is not so great."

All told, the current recruiting season presents a varied and changing picture. And it underscores the difficulties of recruiting new talent—particularly sales and marketing men—in the right numbers, at the right prices.

True, sales recruiters have learned much in recent years—e.g., quotas must be closely attuned to economic forecasts, excessive hiring of nontechnical graduates may backfire.

But it remains to be seen whether chemical company recruiters can effectively respond to the still-hazy prospects for late '61 and '62.

Coffee-Break Selling

Last week more than 5,000 plastics molders and extruders — and other friends of Spencer Chemical Co. (Kansas City, Mo.)—received a coffee break in the mail. Or at least they received the items necessary to take a coffee break — polypropylene coffee cup and spoon and packets of powdered coffee, cream and sugar. It was part of an unusual direct-mail promotion scheme arranged by Spencer's Advertising department.

The firm's ad and PR groups figured the special mailing might be an unusual way to tell plastics processors and others about some recent developments in the company's family of plastic resins.

One of them: Spencer's polypropylene for injection molding. By sending out thousands of cups and spoons, the company called attention to the properties of this fast-growing new resin useful for injection-molded items.

Spencer also touted its new Polyeth 1018 coating-grade polyethylene resin, reported to offer faster production speeds to extruders. The firm pointed up this product by enclosing bags of powdered products that use

Some newer

ORGANOMETALLICS

from

M&T

Sn • Butyltin trichloride
Dibutyltin naphthenate
Dibutyltin sulfide
Dilauryltin dichloride
Dimethyltin dichloride
Dimethyltin oxide
Diphenyltin dichloride
Diphenyltin oxide
Phenyltin trichloride
Tetralauryltin
Tributyltin acetate
Tributyltin chloride
Triphenyltin acetate
Triphenyltin chloride

Sb • Triphenylantimony

Si • Diphenyldi-n-dodecylsilane
Phenylmethyldichlorosilane

P • Triphenylphosphorus

Bi • Triphenylbismuth

Mg • Vinyl magnesium chloride solution in THF

Sn • Dibenzyltin dichloride
Dibutyldiphenyltin
Divinyltin dichloride
Hexabutylditin
Hexaphenylditin
Tetraallyltin
Tetravinyltin
Tribenzyltin chloride
Triphenylallyltin
Triphenylvinyltin

Sb • Tributylantimony
Triphenylantimony dichloride
Triphenylantimony sulfide

Si • Dimethyldivinylsilane
Diphenyldivinylsilane
Diphenylsilane
Phenyltrivinylsilane
Tetravinylsilane
Trimethylvinylsilane
Triphenylsilane
Triphenylvinylsilane

P • Tributylphosphorus
Triphenylphosphorus oxide
Triphenylphosphorus sulfide

These compounds are representative of the hundreds which M&T, as a leader in the research and development of organometallics, has produced. Address inquiries on availability and delivery to Commercial Development Division, METAL & THERMIT CORPORATION, 100 Park Avenue, New York 17, N. Y. **Dept. W.**

M&T Chemicals

polyethylene linings for moisture protection and heat sealability.

In the color-splashed eight-page booklet that accompanied each coffee kit, Spencer also presented sales pitches for a polyethylene resin grade that reportedly is resistant to environmental stress-cracking, and several grades of nylon resins and polyethylene drum liners made from Poly-eth 2100.

Emphasis on Identity

Another major chemical producer is moving toward a more unified corporate "image." Stauffer Chemical Co. (New York), a leader among heavy chemicals producers, has organized a new department to coordinate its packaging and labeling operations. Its aim: to produce a standard and readily identifiable package label design.

Stauffer's new Dept. of Packaging and Labeling will study container specifications and labels, will coordinate these diverse activities among Stauffer's 10 divisions. This effort is intended to standardize package and label design, storage procedures and container-purchasing operations. However, the divisions will continue to oversee such matters as production economics, safety considerations and conformity to government regulation.

Courting Auto Markets

Major aluminum producers passed several milestones, this week, in their efforts to build bigger markets for the metal in automotive applications.

At the Chicago Auto Show, which closed its 10-day program on Tuesday, the top three producers, Aluminum Co. of America, Reynolds Metals Co. and Kaiser Aluminum & Chemical Corp. cooperated in showing the most complete array of aluminum auto parts ever assembled.

They displayed some 500 different parts, 400 of them representing aluminum panels in a glittering array of colors, finishes and textures, and 100 others ranging from complete engines to minute fasteners.

The display was significant for another reason, too. It was only the third time that the hotly competitive aluminum marketers have decided to display their wares cooperatively rather than separately. Previous joint displays were held last year.

DATA DIGEST

• **Vinyl Resins:** New, 24-page brochure covers formulation, processing methods and applications of vinyl resins for plastisols and organosols. Union Carbide Plastics Co. (270 Park Ave., New York 17).

• **Trichloromelamine:** New bulletin presents data on the structure, properties and uses of chlorine-containing trichloromelamine. Uses include rinsing of glassware, dairy and brewery equipment. Chemical Products Division, Wallace & Tiernan Inc. (25 Main St., Belleville, N.J.).

• **Sulfamic Acid Cleaners:** Booklet describes newly developed scale dissolution rates for sulfamic acid cleaners for in-place descaling of industrial equipment. Diagram shows simple equipment cleaning hookups. Public Relations Dept., The Du Pont Co. (Wilmington 98, Del.).

• **Plastic Liners:** New, 20-page manual depicts uses of protective liners for drums, cans, pails and cartons, indicating ideal liner sizes in various thicknesses and types. Protective Lining Corp. (601-39th St., Brooklyn 32, N.Y.).

• **Silicone Rubber:** Specification guide (CDS-145C) contains comprehensive data on applications, typical properties, primary classes and standard industry and military specifications for silicone rubber. Silicone Products Dept., General Electric (Waterford, N.Y.).

• **Polyethylene Packaging:** Materials bulletin (No. 6) cites physical and film properties as well as typical extrusion conditions for low-melt-index polyethylene for food packaging. Eastman Chemical Products, Inc. (Kingsport, Tenn.).

• **Polyether:** Technical bulletin presents charts and graphs illustrating chemical composition and structure, physical, mechanical and thermal properties of new chlorinated polyether. Hercules Powder Co. (910 Market St., Wilmington 99, Del.).

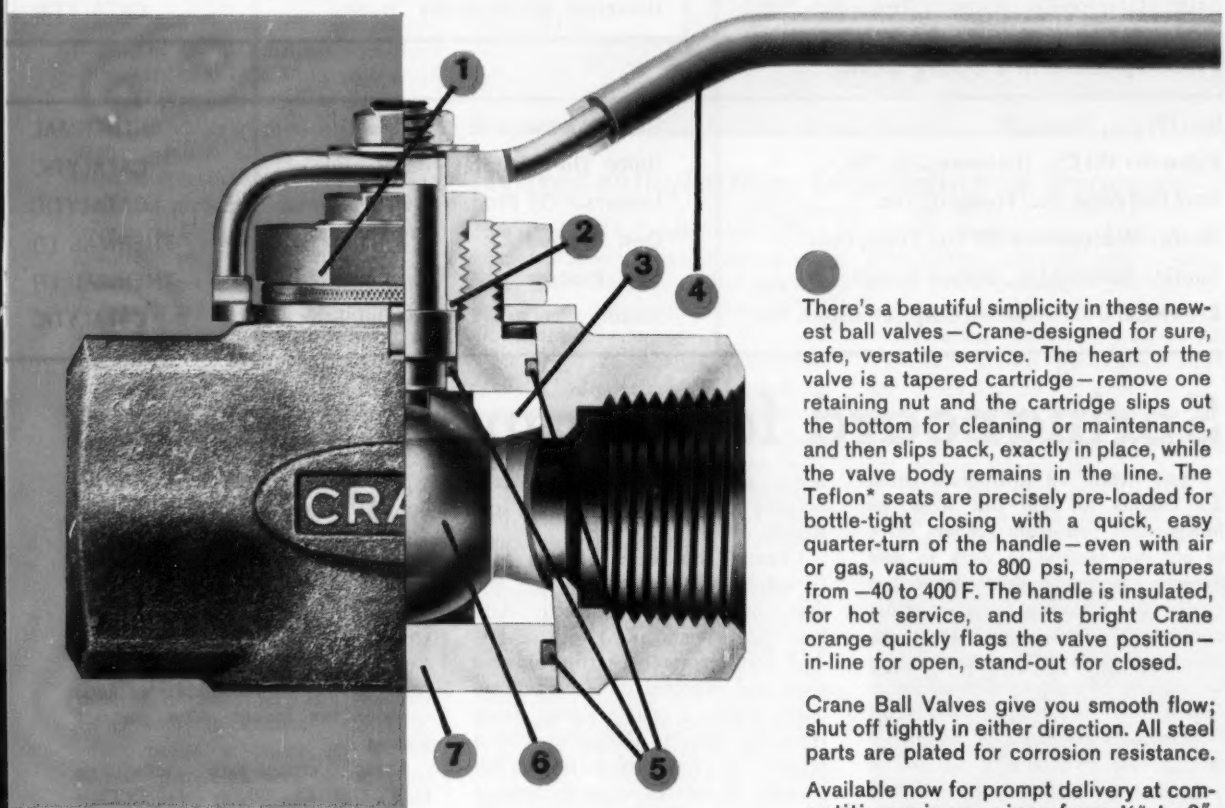
• **Chemical Catalog:** New catalog contains an item-and-size listing of company's complete line of analytical reagent and industrial-grade chemicals. F. P. Jay Chemical Corp. (P.O. Box 42, Waukesha, Wis.).

• **Silicones:** New booklet describes applications of silicone materials. Silicones Div. Union Carbide Corp. (New York).

CRANE BALL VALVES

with the exclusive tapered cartridge that drops out for fast, in-line servicing

engineered for corrosion resistance plus tight shutoff



There's a beautiful simplicity in these newest ball valves—Crane-designed for sure, safe, versatile service. The heart of the valve is a tapered cartridge—remove one retaining nut and the cartridge slips out the bottom for cleaning or maintenance, and then slips back, exactly in place, while the valve body remains in the line. The Teflon* seats are precisely pre-loaded for bottle-tight closing with a quick, easy quarter-turn of the handle—even with air or gas, vacuum to 800 psi, temperatures from —40 to 400 F. The handle is insulated, for hot service, and its bright Crane orange quickly flags the valve position—in-line for open, stand-out for closed.

Crane Ball Valves give you smooth flow; shut off tightly in either direction. All steel parts are plated for corrosion resistance.

Available now for prompt delivery at competitive prices—sizes from ¼" to 2", screwed ends, in bronze, steel and Type 316 stainless.

Call your Crane Distributor or send today for a complete, illustrated folder on the outstanding new Crane Ball Valves, engineered for unmatched service.

CRANE

CRANE CO. Industrial Products Group
4100 South Kedzie Ave., Chicago 32, Ill.

In Canada, Crane Ltd., 1170 Beaver Hall Square, Montreal

Valves/Electronic Controls/Piping/Plumbing/Heating/Air Conditioning

HYDRODEALKYLATION ROUNDUP: QUEST FOR BENZENE AND NAPHTHALENE

These plants are operating	Process	Type
Signal Oil Co., Houston, Tex.	Universal Oil Products' Hydeal	CATALYTIC
Ashland Oil & Refining Co., Ashland, Ky.	Universal Oil Products' Hydeal	CATALYTIC
South Hampton Co., Houston, Tex.	Universal Oil Products' Hydeal	CATALYTIC
These plants are being built		
Sun Oil Co., Toledo, O.	Own Process	THERMAL
Tidewater Oil Co., Delaware City, Del.	Union Oil-Tidewater	CATALYTIC
Dow Chemical Co., Freeport, Tex.	Universal Oil Products' Hydeal	CATALYTIC
Sunray-Midcontinent Oil Co., Tulsa, Okla.	Own Process	THERMAL (?)
Suntide Refining Co., Corpus Christi, Tex.	Own Process	THERMAL (?)
Crown Central Petroleum Corp., Houston, Tex.	Houdry Process Corp.'s Detol	CATALYTIC

Springboard for Aromatics Plunge

More details on hydrodealkylation are coming to light this week, as independent petroleum refiners drive to put this method to work in new benzene and naphthalene plants. Engineers are breaking design-construction schedule records on these units; nine hydrodealkylation plants using six different processes are either under construction or coming onstream; and there are rumors of additional processes in development.

Hydrodealkylation — using hydrogen to crack aromatic oils to benzene and naphthalene—appears certain to sweep through the petroleum industry much as reforming did ten years ago. Although plant capacities and capital investments will be smaller, effects nevertheless will be far-reaching. Impact on coal chemicals has already been called disastrous. A coke-oven operating company executive recently opined that refiners could drive benzene and naphthalene prices down to the point where small coke-oven operators will burn their by-products rather than purify them for market.

In the meantime, every oil refiner with heavy reformate, naphthenic crude oil, or "cat" cracker recycle stock on hand is either inquiring about a hydrodealkylation process, building one, or bringing one onstream.

Coming onstream: Signal Oil (Houston) with the world's first Hydeal unit reaching full capacity; Ashland Oil (Ashland, Ky.) with its Hydeal unit reportedly starting up last week and expected to reach full capacity within a couple weeks; South Hampton Refining (Houston) with a Hydeal unit reportedly starting up but running at reduced capacity because of operating difficulties.

Under engineering and construction: Sun Oil with its own process; Tidewater Oil with a Union Oil-Tidewater process under construction to produce 100 million lbs./year of naphthalene at Delaware City; Dow with a Hydeal unit at Freeport, Tex.; Sunray-Midcontinent with its own process at Tulsa; and Crown Central Petroleum Corp. with the first Detol unit (*CW Technology Newsletter, Feb. 4*) planned for Houston.

This last, Crown Central's Houston unit, highlights the race to bring the hydrodealkylation units onstream. Although the catalytic Detol process is a sister to the Litol process, which the Houdry Process Corp. brought out almost a year ago (*CW, Nov. 14, '59, p. 125*), Houdry didn't release it until January; Crown Central became the first licensee. Now its engineers report that Catalytic Construction Co. (contractor for Crown Central) expects to have the unit ready for operation by the middle of June —about five months after contract signing.

Using critical-path scheduling (*CW, Oct. 15, '60, p. 74*), CCC is turning this unit out in what appears to be record time. Study models are already completed (*see Dimension, p. 47*); crews will move into Crown Central's Houston site next week; and foundation work will be begun the following week.

This rush to get into production increases the risk of the small independent petroleum refiner's choosing a process he really doesn't want. At this point, very little comparative process information is known. The technical literature contains little,* only one commercial unit is in full production; and secrecy is the order

* Exception: a report written by Standard of Indiana engineers for the Aug. '58, issue of *Industrial & Engineering Chemistry*, p. 1135.

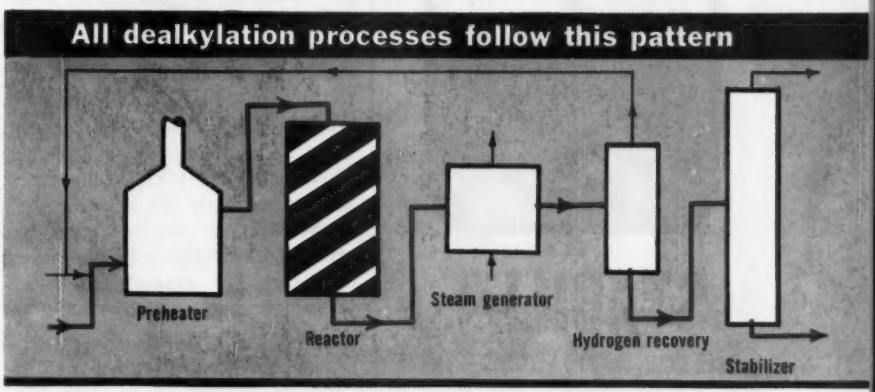
of the day. Individual units may vary radically, depending on feedstock and source of hydrogen; but processors' guarantees are likely to be the same, since commercial plant data to back them up is for the most part lacking.

Cats vs. Therms: In general, however, the field is characterized by a rivalry between thermal and catalytic processes. Both rely on hydrogen partial pressure to detach alkyl groups from benzene or naphthalene rings. The thermal method does this with heat (1200-1400 F) in an operation that resembles ethylene cracking, while the catalytic processes use selective catalytic action at somewhat lower temperatures (1000-1200 F) in units that probably resemble catalytic reformers. Both processes operate at about 800 psi.

Advantages and disadvantages of each route are characteristic. Catalytic units figure on inventory costs (catalysts cost about $1/lb., although total inventory depends on feedstock), replacement costs (catalyst can be ruined by coking during mis-operation), downtime for catalyst change (Houdry says its catalyst will last for at least one year), and operating difficulties associated with catalyst loss and make-up.

Thermal units face the temperature bugaboo. At hydrodealkylation's operating conditions, every additional 50 F appreciably lowers the tensile strength of steel, increases required vessel-wall thicknesses. Cracking, which begins at about 800 F for normal petroleum and about 1000 for aromatics like benzene, can lead to polymer or coke formation on inadequate quench. And sulfur, at hydrodealkylation temperatures, becomes extremely critical; it promotes cracking, forms thiophene (ruinous to product specifications), and increases corrosion.

But the characteristic pros and cons of thermal and catalytic-cracking operations are well-known to refiners, who will be looking for a process to make benzene or naphthalene out of their petrochemical by-products. The critical factors for them are yields and hydrogen consumption: yields, because the difference between some of the current claims can pay for a dealkylation unit in three years; and



Hydrodealkylation: Dissecting a Process

A simplified hydrodealkylation flow scheme is shown above. Although detailed information is closely guarded by licensees, some generalizations are now possible.

Sulfur: Like catalytic reformers, catalytic hydrodealkylators convert organic sulfur into hydrogen sulfide for separation in the off-gas; whereas feeds to a thermal unit must be completely desulfurized. A refiner with a sulfurous feed should include the cost of desulfurization when considering a thermal unit.

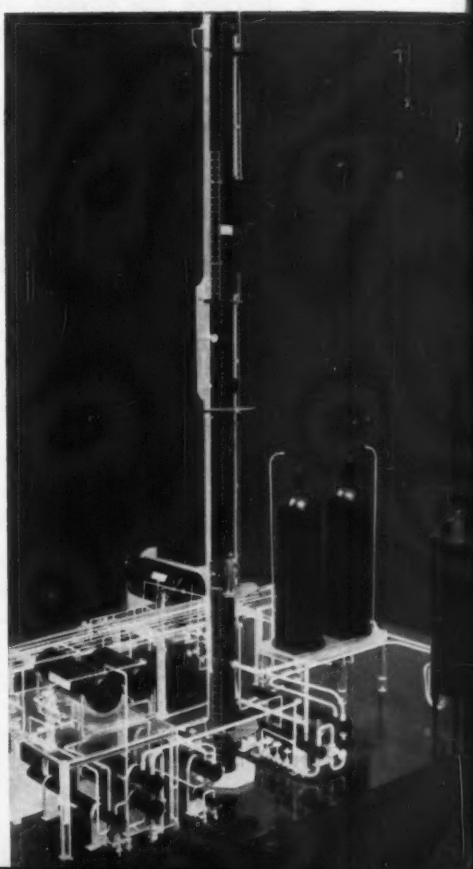
Hydrogen: Since total pressure depends on hydrogen partial pressure, purity has a direct effect on the pressure in the reactor. Prospective processors must balance cost of purifying hydrogen against cost of compression. One point: for purifying hydrogen recycle, lean oil absorption systems should take into account the build-up of aromatics in the lean oil; aromatics decrease absorptivity for methane, lead to methane in the recycle.

Furnace: The reaction is exothermic, but is hardly more difficult to handle than ethane-ethylene pyrolysis; and furnace designs resemble those for ethylene furnaces. Hydrogen is added before the furnace to prevent coking, and the tube passes are arranged to provide the optimum temperature-time conditions. Thermal processes are believed to quench the furnace effluent in a manner similar to that of ethylene processing. Heat pick-up at this point is a question of comparative economics.

Catalyst: Catalysts are selected for selective hydrogenation. Available literature indicates that calcined alkalized chromia-alumina catalysts are superior to cobalt-molybdenum oxides.

Separation: Since nearly all of the alkyl side-chains on the aromatic rings are cracked and hydrogenated to methane, ethane, and propane, separations from benzene and naphthalene are more or less routine.

When aromatics are cracked to longer hydrocarbons, separation may be more involved.



CCC's model (right) shows Detol unit with stabilizer, reactors, furnace.

hydrogen consumption, because it is a major raw material cost.

To begin with, the refiner who makes benzene is penalized by a natural volume shrinkage between his liquid feeds and products. Thus the maximum theoretical yield possible for toluene feed is 83.65%, for *o*-xylene it is 73.64%, for *m*-xylene 72.34%, *p*-xylene 72.04% and for ethylbenzene 72.54%. To this the refiner must apply an effective yield of 80-98% of the theoretical, depending on the claims of the process developer. For example, UOP advertises benzene yields of 90-95% of theoretical for toluene, and 80-90% for xylenes; Houdry's offer talks yields of 96.5-97.5% of theoretical, depending on feed stocks; and thermal processes are reported to give yields of 96-98%. When questioned, thermal processors and catalytic processors say of the other: "They can't do it!"

After yield, the next question is: What kind of feedstock? This is easier; it harks back to a marketing history that has led a prolific oil industry to spawn the present rash of processes. Coming into the last decade, most oil refiners were operating catalytic reformers to upgrade high-boiling gasoline and middle distillates (e.g., naphtha and kerosene) to a high-quality reformer gasoline. However, during the '50s, automobile engine compression ratios went up, octane ratings climbed with them, refiners were forced to distill the heavier ends off their reformer gasoline and—although the rising jet market took some of this heavy gasoline —it grew into a surplus. Refiners, in an attempt to increase octane rating by knocking side-chains off the benzene ring, came up with hydrodealkylation. When the current shortage of benzene and naphthalene developed, they were ready with a rash of processes.

These reformate feedstocks are usually extracted to give up their toluene, xylenes, etc., before conversion to benzene. For naphthalene, feedstocks can be 415-540 F boiling-point materials from naphthenic crude oils, cycle oils from cat crackers, tail ends from catalytic reforming units, and aromatic extracts from kerosene or JP-4 jet fuel (resulting from sulfur dioxide, furfural, or phenol extraction).

It is still too soon to critically appraise the various processes. But this much is certain: hydrodealkylation has moved out of the pilot-plant stage and into full-scale operation. The next few years will tell which route and which feedstock can prevail in a market that will become increasingly competitive.

PROCESSES

Chromate Analysis: Equipment and chemical techniques for rapid, automatic determination of chromates have been developed by Technicon Controls, Inc. (Chauncey, New York). By means of an electronic instrumentation system that requires no supervision, the analysis can be made down to parts-per-million. The technique is based upon the reaction between the chromate ion, or hexavalent chromium, and diphenylcarbazide in acid solution to give a soluble purple product. The intensity of this purple is measured in a colorimeter and transmitted to a linear or logarithmic recorder.

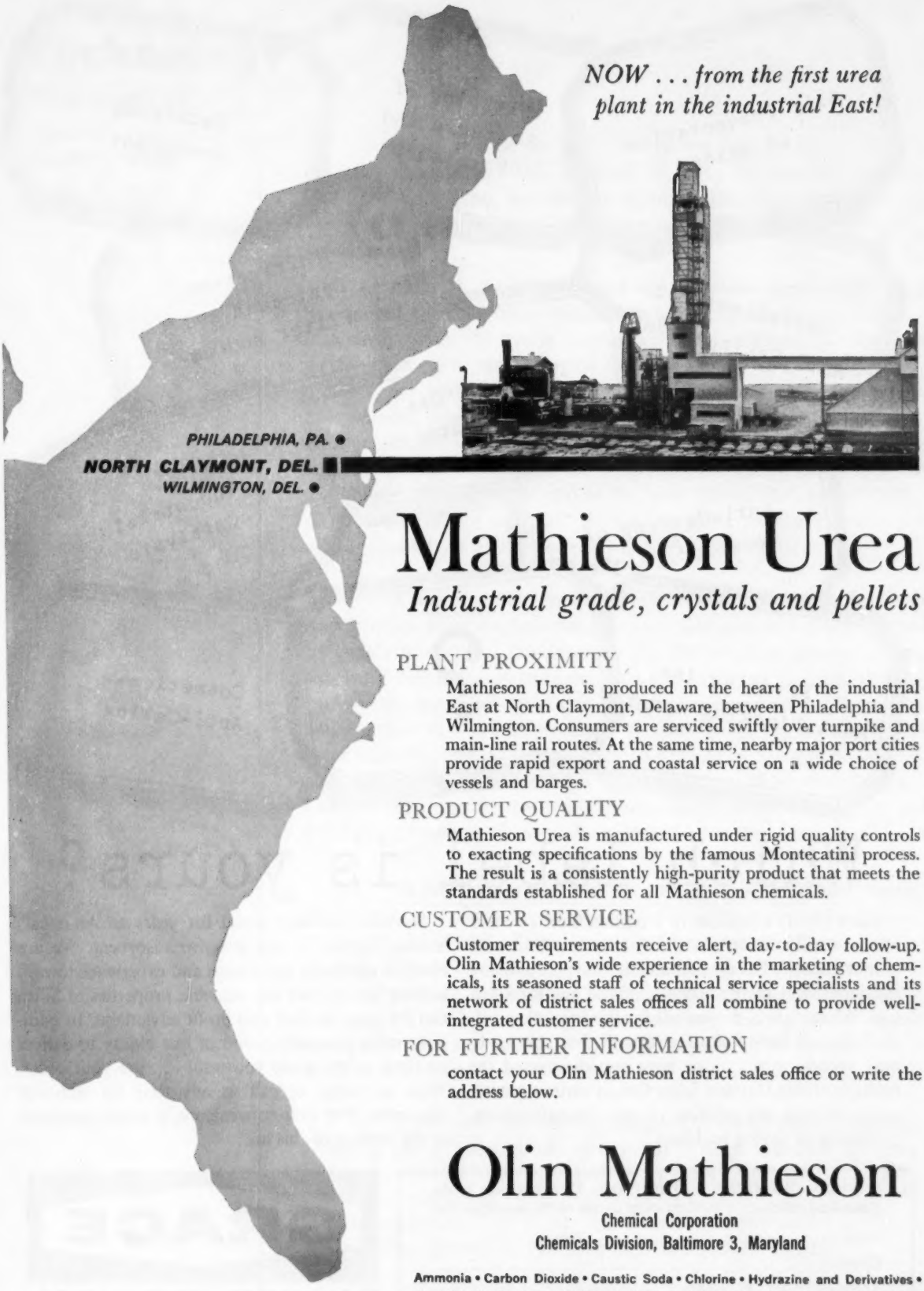
•

Critical Pebble Bed: Mallinckrodt Nuclear Corp. (St. Louis, Mo.), has just received, as part of the "Atoms for Peace" program, an order to supply 325 lbs. of 20% enriched uranium for what is believed to be the world's first pebble bed reactor to advance beyond the research stage. The reactor is a high-temperature gas-cooled vessel at Arbeitsgemeinschaft Versuchsreaktor (AVR) (Dusseldorf, Ger.). Fuel elements for the reactor are in the form of graphite pebbles containing uranium-carbide in the center as the fuel material. The reactor, now under construction, is scheduled to go critical in '63. Total cost of the reactor is $9.6 million, half of which will be borne by the German government, the rest by private industry.

•

Nuclear Fuel: Nationalist China's first nuclear reactor has just received a quarter-ton of uranium fuel elements. The 1,000-thermal-kilowatt reactor, at the National Tsing-Hua University (Hsinchu, Taiwan), is an open-pool research reactor scheduled to go critical in March. Fuel, in the form of 35 elements, was shipped from General Electric's Atomic Power Equipment Dept. (San Jose, Calif.).

NOW . . . from the first urea plant in the industrial East!



Mathieson Urea

Industrial grade, crystals and pellets

PLANT PROXIMITY

Mathieson Urea is produced in the heart of the industrial East at North Claymont, Delaware, between Philadelphia and Wilmington. Consumers are serviced swiftly over turnpike and main-line rail routes. At the same time, nearby major port cities provide rapid export and coastal service on a wide choice of vessels and barges.

PRODUCT QUALITY

Mathieson Urea is manufactured under rigid quality controls to exacting specifications by the famous Montecatini process. The result is a consistently high-purity product that meets the standards established for all Mathieson chemicals.

CUSTOMER SERVICE

Customer requirements receive alert, day-to-day follow-up. Olin Mathieson's wide experience in the marketing of chemicals, its seasoned staff of technical service specialists and its network of district sales offices all combine to provide well-integrated customer service.

FOR FURTHER INFORMATION

contact your Olin Mathieson district sales office or write the address below.

Olin Mathieson

Chemical Corporation
Chemicals Division, Baltimore 3, Maryland

Ammonia • Carbon Dioxide • Caustic Soda • Chlorine • Hydrazine and Derivatives • Hypochlorite Products • Methanol • Muriatic Acid • Nitric Acid • Soda Ash • Sodium Bicarbonate • Sodium Chlorate • Sodium Chlorite Products • Sodium Methylate • Sodium Nitrate • Sulphur (Processed) • Sulfuric Acid • Urea 9079

Which label is yours?

Silica Gel is a product of a million faces . . . and almost a million uses. Its ability as a desiccant with unique capacity has made it an essential part of many industries. But there are thousands of uses for Silica Gel. What "label" do you use for this versatile product? Do you have Silica Gel classified as able to do only specific jobs . . . or have you discovered the multiple ability Davison Silica Gel, in various grades, can provide in the solution of your manufacturing, packaging or drying problems?

Davison has been noted for years as America's leading supplier of this selective adsorbent. We are ready to apply our knowledge and experience toward helping you exploit the valuable properties of Silica Gel for your product and profit advantage. In addition, we're naturally proud of our ability to deliver on time, in the grade you want . . . per your order. Write us today, or call us any time for technical assistance. For your convenience, a handy coupon is at the bottom of this ad.

DAVISON CHEMICAL DIVISION, Dept. 3503, Baltimore 3, Md.
Please send information and facts about the use of Davison Silica Gel.

Name.....Title.....

Company.....

Address.....

City.....Zone.....State.....

GRACE

DAVISON CHEMICAL

BALTIMORE 3, MARYLAND

Technology
Newsletter

CHEMICAL WEEK
March 4, 1961

Latest entry in the hydrodealkylation contest (*see p. 46*) is a thermal method, called HDA, developed jointly by Hydrocarbon Research, Inc. (New York City), and Atlantic Refining (Philadelphia). Key to the new process is said to be a special reactor design that permits close operating control.

Although the HDA process admits to one need—sulfur must be removed from the feed—it claims to have four advantages that more than compensate: (1) avoids catalyst handling problems, (2) has high yields—up to 98%, depending on feed, (3) has proved (via long runs in a 5-bbls./day pilot plant) that it can produce either naphthalene or benzene without coke formation, and (4) reduced investment costs: HRI-Atlantic officials say that "with current nonpremium prices of benzene and naphthalene, this process will have a pay-off time of less than a year for a plant to produce 50 million lbs./year of naphthalene or 42,000-63,000 gals./day of benzene." So far, no plans for commercialization of the process have been revealed by either HRI or Atlantic.

•

A new route for producing magnesium oxide and hydrochloric acid from sea water employs thermal reaction in a spray furnace. Devised by Israel's Ministry of Development, the thermal-spray process converts sea water directly to magnesium oxide and hydrogen chloride, thus bypassing the magnesium hydroxide precipitation step used in conventional magnesium-from-seawater processes. A plant using the process is now being built at Sodom on the Dead Sea; and the Israel Ministry of Development has contracted with Nordoc Co., a subsidiary of Woodall-Duckjam, Ltd. (Great Britain) for the British firm to handle world rights to plan and build plants based on decomposition of salts other than magnesium.

•

Various metals can now be vacuum cast better and cheaper thanks to a new patented chemical, called Nojulite (covered by Japanese Patent No. 35-30036). That's the claim of its inventor, Teruo Shiraishi (Tokyo). The chemical (a mixture of seven metallic halides and salts) generates chlorine gas, creates a seal around the molten metal during pouring. Savings—from reduced melting losses and fewer casting rejects—appear so attractive that a Swiss firm is reportedly negotiating for exclusive patent rights covering a three-year period.

•

A new nitric acid process developed by the Hercules Powder Co., is said to give a high yield of concentrated product, to reduce investment and operating costs, and to eliminate air pollution problems associated with nitric acid production. Key: Extractive distillation with a solution of magnesium nitrate. The process was described at this week's meeting of the American Institute of Chemical Engineers in New Orleans.

In the process, 60% nitric acid is produced by ammonia oxidation, then concentrated to 99.99% by extractive distillation, in a specially

designed tower, using the magnesium nitrate solution. This is then concentrated by vacuum flash evaporation and recycled.

•

Don't look for any important changes in government patent policies by the Kennedy Administration or Congress this year. It now has two reports from outside experts saying, in effect, that there is no urgent need to alter current patent and licensing policies.

The first report covered policies of the Department of Health, Education and Welfare (*CW Washington Newsletter, Feb. 25*). The second, done for the General Services Administration by George Washington University, covers policies of the Defense Department and Atomic Energy Commission.

The latter report contends that the controversy over who should hold patents to products developed through the use of government research grants is greatly exaggerated. The report found that relatively few patentable products come out of such research.

•

A thrust of 1,550,000 lbs. was obtained for a few seconds in a static test of the F-1 engine at Edwards Air Force Base in California. It's the largest thrust achieved by a single engine so far by the U.S. Fuel for the F-1, the largest rocket booster under development by the U.S., is liquid oxygen and RP-1. Present plans call for the Rocketdyne Division of North American Aviation, Inc., to complete development of the engine by '64.

•

More states are moving toward a "research tax" to finance industrial development of agricultural commodities. In the latest move, a bill has been introduced into the Iowa legislature, calling for a research fund to be financed by a state-wide tax similar to the arrangement in Nebraska (*CW, Dec. 17, '60, p. 77*). State Senator Frank Hoxie predicts that the bill will be acted on during this session. Colorado may also have a similar proposal to act on this year.

•

Private sponsorship of cotton research and promotion is also getting a boost. Cotton producers are setting up a new organization, the Cotton Producers Institute, to collect and administer voluntary contributions of $1/bale. Starting in the West this year, the institute will be extended to include the central belt in '62 and the Southeast in '63. Ultimate income is expected to be $3-3.5 million/year.

•

Another process for polymerizing trioxane is reported in Australian patent application 62,008/60. British Industrial Plastics, Ltd. (London), polymerizes the material under anhydrous conditions in the presence of an electrophilic catalyst. Du Pont and Celanese both have U.S. patents on transforming trioxane into a crystalline polyformaldehyde resin (*CW, Feb. 18, p. 139*), and Celanese uses trioxane as one of the monomers in its new Celcon copolymer (*CW, Feb. 25, p. 23*).

CW PHOTO—W. ROSENBLUTH

TB&C's Franklin and Fennebresque map marketing plans for line of styrene-maleic anhydride copolymers.

Putting a Newcomer in the Polymer Picture

A new group of low-molecular-weight styrene-maleic anhydride copolymers is debuting this week. The materials are of potential interest to makers of such products as latex paints, floor polishes, adhesives, tanning agents and coatings. Producer of the new resins, Texas Butadiene & Chemical Corp.—better known as a producer of bulk petrochemical products than as a supplier to the specialties chemical field — has gone into semicommercial production (1 million lbs./year) in South Miami, Fla.

Introduction of the linear polyanhydrides and their derivatives under the name SMA Resins, marks TB & C's entry into the field of resins and plastics.

The new resins, which sell for 59¢/lb. in drum quantities, are made by a new process developed by I. E. Muskat, a former research director of Pittsburgh Plate Glass, who is working with TB & C in a consultant capacity.

Though not the first styrene-maleic anhydride copolymers to be offered, the new copolymers—because of their short chain length (molecular weight as low as 400 is available) and polanhydride structure—are thought to have application where now-available styrene-maleic anhydride copolymers (molecular weight around 5,000) are limited. TB & C, through its Polychemicals Dept. headed by William Franklin, is offering the new copolymers in five separate series, but major activity will concentrate on the SMA 1000A series, which has a molecular weight of about 1,600.

Aimed at Coatings: Biggest potential market for the SMA resins appears to be the coatings field. In water-emulsion paints the copolymer functions both as a modifier of the latex (styrene-butadiene, polyvinyl acetate, acrylic, polyvinyl chloride, etc.) and as a film-forming protective colloid and pigment dispersant. The low molecular weight of the material and its surface-active properties allow the paint formulator to boost his pigment volume concentrations (PVC) without substantially increasing the viscosity of the finished product. For instance, a 60% PVC acrylic flat paint with a KU (Krebs Units) viscosity of 85-90 is possible with the new resin.

Gloss latex paint using commercially available acrylic and polyvinyl acetate emulsions appear to be good possibilities with the new copolymers. Also a possibility: water-soluble baking finishes. These are made by dissolving the resin in an aqueous alkaline solution with water-soluble glycols (or in an organic solvent along with glycols and/or oxiranes) and then heating them to form cross-linked thermosetting resins.

Pushing for Polishes: Because they're readily soluble in aqueous alkaline solutions and offer low viscosities at relatively high solids content, the resins also appear to have good potential in the floor polish field. In fact, resins of this type (but not of this low molecular weight) are already being used in the polish field; Monsanto's Lytron 822, thought to be a butyl half ester, is a copolymer of this type.

Other possible markets TB & C foresees are in paper coatings, dispersants, epoxy curing agents and aerosol hair sprays. Ore flotation reagents, lubricating greases and antigraying agents in synthetic detergents might also incorporate these resins.

Join the Crowd: Monsanto got into production of styrene-maleic anhy-

dride copolymers during World War II when it developed a produuct, JQD (Jefferson Quartermaster Depot) 242, which was used in place of starch sizing on tenting cloth. Monsanto still makes the product at its Everett, Mass., plant (price: around 50-55¢/lb.), sells it mainly to the textile industry under the name of Stymer S for cellulose acetate sizing and under the Lytron label for floor polishes. It's also thought to use some captively in some of its paint latexes.

Union Carbide Chemicals has also been associated with the compound, was known to have been making the copolymer mostly for use, it's thought, as an emulsification aid in polmerization of polyvinyl acetate, polystyrene and polyvinyl chloride.

Why Try? It's interesting to speculate why Texas Butadiene, which is neither basic in styrene nor maleic anhydride, should be interested in making the SMA resins. The answer probably lies more in the area of markets than of raw materials. Presently TB & C has only two finished products, aviation gasoline and synthetic rubber, which it looks to as volume markets for the butadiene and alkylate it makes at its new (on-stream Feb. '57) $32-million plant at Channelview, Texas (near Houston). The government facility contract for aviation gasoline runs out in July '62, and the company's four big contracts with synthetic rubber producers are due to terminate in the not-too-distant future (one late this year, two next, the other in '63). The wide range of uses for the SMA resins will permit the company to insinuate itself into new product and marketing areas.

The SMA resins, if successful in semicommercial production, will be turned out in new plant facilities at Channelview (initial production around 5-10 million lbs). Also slated for possible production at this location is a line of liquid butadiene polymers and copolymers. These products are now under development by TB & C, are said to show promise as surface coatings and in plastics applications.

Aerosol Contraceptive

An aerosol contraceptive, a type of product long thought to have good sales potential by the pressurized packaging industry, will be available on a nationwide basis for the first time this week.

Called Emko Vaginal Foam, the product is manufactured by the Emko Co., a subsidiary of Sunnen Products Co. (St. Louis).

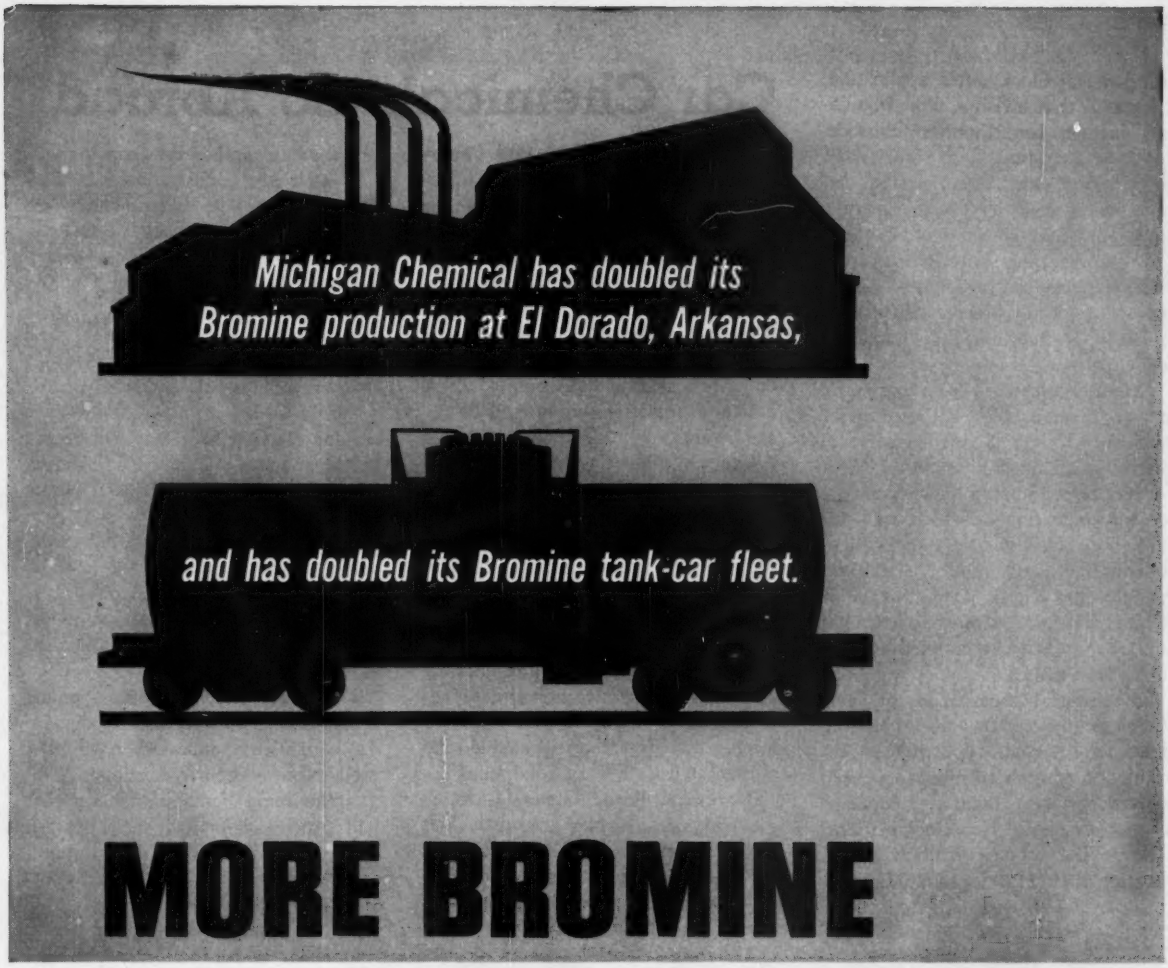
This is the company's first venture into consumer products and a surprising departure from its traditional business of making honing machinery and automotive engine rebuilding equipment.

The foam is packaged in a coated glass bottle containing about 35 applications. Retail price: $2.95. A separate transparent plastic syringe is provided for application. Larger bottles will be available to health departments and birth control clinics at a reduced rate.

The foam is a spermicide, gives further protection by creating an ac-

Chemical Tear Jerker Wars on Would-be Bad Actors

Protection against mashers and purse snatchers is the objective of a new product developed by the Hanlon Chemical Co. (Kansas City, Kans.). Called Hanlon's Escort, it's a squeezable plastic container that will shoot out a lachrymatory dye; the tearful would-be assailant is marked with a difficult-to-wash-off bright color. On white skin the dye forms a reddish mark; on negroes, it leaves a violet color. The dye has been approved by the Food and Drug Administration, and is said to have no lasting harmful effects, and visible traces wear off in about two weeks. A fluorescence lingers, is visible under ultraviolet light (available at most police departments). Retailing for $2.49, the product is recommended by police in several big cities as an effective weapon for women walking in dark or strange areas. Taxi drivers are another potential user of the device.



MORE BROMINE FOR YOUR PROCESSES

With the placing on stream in August of new facilities at the Michigan Chemical Corporation — Murphy Corporation bromine plant near El Dorado, Arkansas, there now is available an added supply of bromine for your normal requirements, your immediate peak demands, and your plans for increased bromine usage. And because of our enlarged tank-car facilities you can be sure that your delivery schedule can be met.

This added capacity to our present production at El Dorado and from plants at Saint Louis and Manistee, Michigan permits active research by you on this basic chemical element to take advantage of bromine's unique properties and characteristics.

Investigate what bromine offers you in higher yields, processing advantages, and new product opportunities. Also, check with us on the use of Michigan Chemical brominated compounds — standard production or custom-made to your specific needs.

Write for a copy of our authoritative compilations, "BROMINE, Its Properties and Uses," and "How to Handle Bromine."

For complete listing of Michigan Chemical products, see your copy of Chemical Materials Catalog

MICHIGAN CHEMICAL CORPORATION

697 North Bankson Street, Saint Louis, Michigan
Eastern Sales Office: 230 Park Avenue, New York 17, N. Y.

tual physical block; after application, it forms a thin invisible film. Ingredients include benzethonium chloride, nonyl phenoxypolyoxyethylene ethanol, myristic acid, stearic acid, triethanolamine, glyceryl monostearate, polyoxyethylene sorbitan mono-oleate and monolaurate, polyvinyl pyrrolidone, polyethylene glycol, and deionized water. Ten percent of the formulation is fluorinated hydrocarbon propellant.

Philanthropic Start: The company's unusual diversification is the result of President Joseph Sunnen's personal interest in planned parenthood. With outside help, Sunnen developed the aerosol contraceptive which was initially distributed free in Puerto Rico. Sunnen has contributed $350,000 to the Puerto Rican Department of Health for birth-control work, has donated his product to birth-control clinics in the U.S.

Established companies in the spermicide field are known to be looking at an aerosol contraceptive. Their introduction of such a product has been delayed by two factors: reluctance to tamper with tried formulations; a desire for a better method of application than a syringe like Emko's.

Clean Sweep

Soap and synthetic detergent sales hit a new peak in '60, according to the Association of American Soap & Glycerine Producers, Inc.

Fifty-eight manufacturers, representing a substantial portion of the industry, reported sales totaling 4.4 billion pouunds valued at $1.1 billion. Sales were up 2.3% in volume and 2.4% in value from '59, the previous record.

Sales of synthetics amounted to 3.3 billion pounds and $800.6 million, an increase of 3.3% in pounds and 3.4% in dollars over '59. Solid synthetic detergents totaled $580.5 million, up 1.6% over last year. Liquid synthetics, which have been expanding greatly, totaled $220.2 million, a rise of 8.5%.

Soap sales totaled 1.1 billion pounds and $319.2 million, about the same as '59 sales.

Scouring cleanser sales, not included in the soap and synthetic detergent statistics, totaled 374.9 million pounds which were worth $50.9 million. Sales in '59 were 367 million pounds valued at $50.8 million.

Car Chemicals Go Abroad

Chrysler Corp.'s Cycleweld Chemical Products Division (Detroit), which recently announced entry into the consumer car-care field, will soon begin selling its products overseas.

Although Cycleweld will not identify the exporter, it is known that the division has signed Platka Export Co. (Ft. Wayne, Ind.) for foreign distribution. Platka will supply 7,000 outlets around the world with Cycleweld wares.

Domestically, Chrysler's chemical arm hopes to combine a nationwide system of independent warehouses, jobbers and manufacturers' agents to channel the items into the 280,000 U.S. service stations by fall of this year. Presently, more than a dozen of the largest warehouses are in the fold.

The retail auto specialties market, excluding antifreeze, is estimated at an annual $600 million. Chrysler is hoping that its name will enable it to garner at least 5% of total sales.

Normally Ford, General Motors and Chrysler distribute auto specialties through their dealers, but Cycleweld will aim for the service stations and independent garages servicing suburban as well as metropolitan areas.

The 6,000 Chrysler Corp. dealers will be able to get Cycleweld products in the future, but not through regular Chrysler channels.

A recent study showed that only 28% of car owners return regularly to dealers for service. Others go to neighborhood garages, mainly because they are more convenient. All Chrysler divisions, however, including Cycleweld, encourage Chrysler car owners to return to their dealers for service.

Cycleweld entered the consumer market with five products, has added two more in the past three months. It is anticipated that a total of 32 products will be introduced slowly as feedback from the still incomplete distribution system indicates a receptive market, according to John Smith, Cycleweld's sales manager.

At least two of the products have application outside of automobiles. Pry, a heavy-duty penetrating oil, and Start 'N Go, a two/four-cycle engine oil, can be used in lawn mowers, outboards and motor scooters. These could be marketed in hardware stores, and the latter in boating shops as well.

Cycleweld's initial products also included Keen Site, a methanol-based windshield-washer solvent; Moto Prep, a polymer additive to increase viscosity index of oil; and Top Tonic, a top oil gasoline additive.

A polyglycol heavy-duty brake fluid has been added to the line, as has a dry organic pellet called Cyclelox, which is added to the radiator as a sealant. One of the pellets will be put in the radiator of each Chrysler car and truck as it comes off the assembly line.

The division has also started to develop structural cements for bonding metal to metal, wood, and plastics. It is now one of about a dozen suppliers of adhesives and sealers to the auto industry.

Cycleweld developed the bonded brake lining, the biggest application for which auto adhesives have been used. Now it reports development of a brake-lining bonding material that will provide unlimited shelf life for bonded brakes. This means that bonded brake shoes can be shipped overseas for the first time.

Future products expected to go on the market under the Cycleweld label include an aluminum corrosion inhibitor, a transmission sealer, vinyl and upholstery cleaner, gum and sludge remover, paint stripper, body solder, and gasoline antifreeze.

These products will be marketed as they are needed, Chrysler says.

Silicone Entries

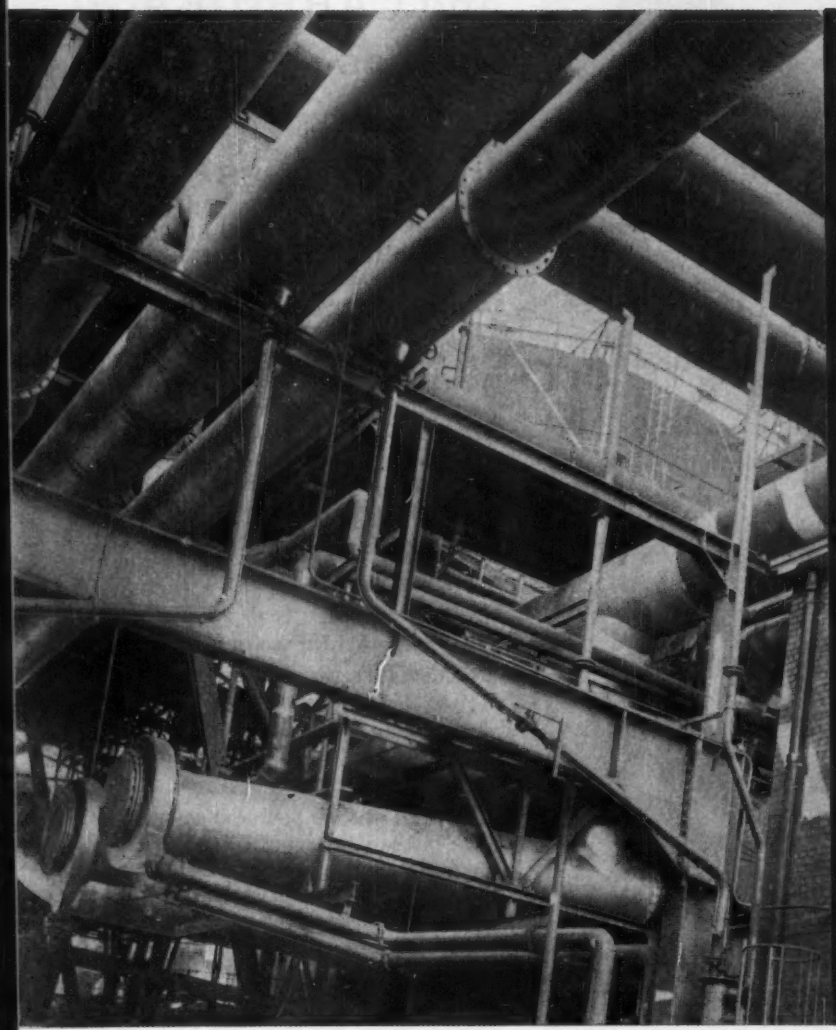
Two new items have recently been added to Dow Corning Corp.'s (Midland, Mich.) line of silicone products.

Silastic RTV 601, a free-flowing fluid silicone rubber that vulcanizes in sections of unlimited thickness at room temperature, requires only the addition of a catalyst and 24 hours to set up into a rubbery solid. The product is particularly recommended for making flexible molds, casting of prototype parts, and encapsulating electrical and electronic components.

The other product, Sylgard 182 Resin, is a new, transparent silicone encapsulating material. It reportedly has good dielectric properties, moisture resistance and toughness.

BASF Intermediates

For the Chemical and
Pharmaceutical Industries
we supply:



Amines · Alcohols

Amino alcohols

Aldehydes

Acetylene alcohols

Pyrrolidones

Organic acids

Dyestuff intermediates

1/952a

Badische Anilin & Soda Fabrik AG

BASF knows how

Literature describing these products will be gladly forwarded on request. Fill in the coupon and send it to us.

BASF
Advertising Dept.

LUDWIGSHAFEN AM RHEIN
West Germany

We are
interested in _____

_____

Please
forward
literature

to

NAME _____

ADDRESS _____

Softness sold this towel...

and CARBIDE's amines gave it that softness

Textile softeners, based on CARBIDE's amines, give linens and cottons the softness that makes them sell. And, with the complete selection of amines available from Union Carbide, you can make textile softeners that give the right kind of softness for best sales appeal in finished goods. Cationic mill-softeners, prepared by fatty acid esterification or amidification of CARBIDE'S amines, offer a full range of softening effects. Here are seven amines for your evaluation:

- Triethanolamine
- Diethanolamine
- N-Aminoethyl Ethanolamine
- N-Methyl Diethanolamine
- Diethylene Triamine
- Dimethylamino Propylamine
- Diethylamino Propylamine

Remember, whether you need amines . . . UCON textile lubricants . . . anti-foaming agents for scouring and mercerizing . . . water-insoluble solvents to achieve deeper and fuller shades in dyeing . . . monomers for fiber syntheses . . . ethanolamines and TERGITOL nonionic surfactants for detergents . . . or other organic chemicals for finishing agents and lubricants . . . you'll find them at CARBIDE. With more than one hundred CARBIDE textile chemicals to choose from, you can take advantage of the increased savings of bulk buying in mixed tank car and mixed tank truck lots, or mixed carload lots in drums.

For information and help from experienced Technical Representatives, call your nearest CARBIDE sales office or write to: Union Carbide Chemicals Company, Division of Union Carbide Corporation, Dept. J, 270 Park Avenue, New York 17, N. Y.

UNION CARBIDE CHEMICALS COMPANY

UNION CARBIDE

Market Newsletter

CHEMICAL WEEK
March 4, 1961

More synthetic fiber competition is brewing this week, as polypropylene producers jockey for a position in the textile market. Hercules has started up its multifilament polypropylene fiber plant at Covington, Va., expects to be at near capacity production (10-12 million lbs./year) by July. Shell and Reeves Bros. have signed an agreement to work on the development of polypropylene in the fiber field. And AviSun Corp. is now sampling polypropylene fiber from a pilot plant at New Castle, Del., expects to complete a semicommercial-sized plant by the end of the year.

•

The first shipment of petroleum naphthalene (about half million lbs.), left Ashland's Catlettsburg, Ky., plant last week for delivery to five customers. Transported in specially insulated 10,000 gal. tank cars, the raw material went to American Cyanamid at Bridgeville, Pa., Reichhold at Detroit, Mich., Sherwin-Williams and Witco at Chicago, Ill., and Standard Naphthalene Products Co. at So. Kearny, N. J.

•

U.S. liquid oxygen-nitrogen capacity is increased another 140 tons/day with the recent start up of Linde Co.'s (division of Union Carbide Corp.) new plant at Neosho, Mo. Part of the output will be used to supply the rocket project at nearby Fort Crowder, with the remainder to be distributed to industrial gas users throughout the southwestern U.S. One growing market for liquid nitrogen in the Southwest, is in oil-well uses, such as swabbing and perforating. (Although gaseous nitrogen is used in these applications it will be shipped from Linde's Neosho plant in liquid form.)

•

Meanwhile, the importance of oxygen and nitrogen to the chemical industry was underscored in New Orleans, La., this week by Air Reduction Sales Co.'s J. T. Hugill, manager of tonnage product sales. According to Hugill, the chemical industry accounts for about 41% of total oxygen-nitrogen operating capacity (captive and commercial plants) on this continent, or about 4,300 tons/day of oxygen equivalent (includes nitrogen used for ammonia syntheses). The principal process users and the approximate tonnage involved, are estimated as follows: 1) ammonia synthesis gas, both oxygen and nitrogen—1,500 tons/day; 2) acetylene—1,600 tons/day; 3) ethylene oxide—600 tons/day; 4) oxidation of propane and/or butane—400 tons/day; 5) methanol synthesis gas—200 tons/day.

•

Three more British drug firms reduced the prices of their tetracycline antibiotic compounds this week in line with the recent 12% price cuts posted by Cyanamid of Great Britain Ltd. (*CW Market Newsletter, Feb. 25*). Companies involved are E. R. Squibb and Sons Ltd., the ethical pharmaceutical division of Aspro-Nicolas Ltd., and Pfizer Ltd. Price cuts on other British drugs are expected in the near future.

Another furor over surplus corn use for alcohol manufacture may be in the cards. Publicker Industries, the country's largest fermentation alcohol producer, is again reportedly seeking quantities of the surplus farm product from the U.S. Dept. of Agriculture. The Philadelphia-based company tried last spring (*CW Washington Newsletter, Apr. 30, '60*), but voluble opposition by nonfermentation industrial alcohol makers put the lid on any USDA-Publicker deal.

Although Publicker won't officially comment on the situation, trade observers see the new approach to USDA as a shrewdly necessary economic move. Over the years, Cuban Molasses has been the firm's prime source of alcohol raw material. It was reportedly ready to take some 120 million gals. out of the current crop (at an average price of 10¢/gal.), when President Kennedy frowned on U.S. purchases of Cuban molasses at this time because of the political situation (*CW Washington Newsletter, Feb. 25*).

Thus with its molasses supply effectively cut-off, Publicker's alcohol operations could be in a bad way unless it can latch onto an alternative raw material such as the surplus corn.

The Kennedy Administration's concern over rising unemployment may well be a factor in any USDA decision. Reason: Publicker indicates that it may have to lay off a couple of thousand Philadelphia-area workers if it doesn't get the corn to keep its alcohol plant running.

•

Initial production of copper sulfate is expected this month from Border Chemical Co.'s new $250,000 plant near Transcona, Manitoba. Sulfuric acid will be supplied by Border Chemical's adjoining acid plant, while copper will come from Flin-Flon, Man. Output is expected to reach about 6 million lbs./year. The distribution area will range from Lakehead to Vancouver in Canada, and include some Midwestern areas of the U.S.

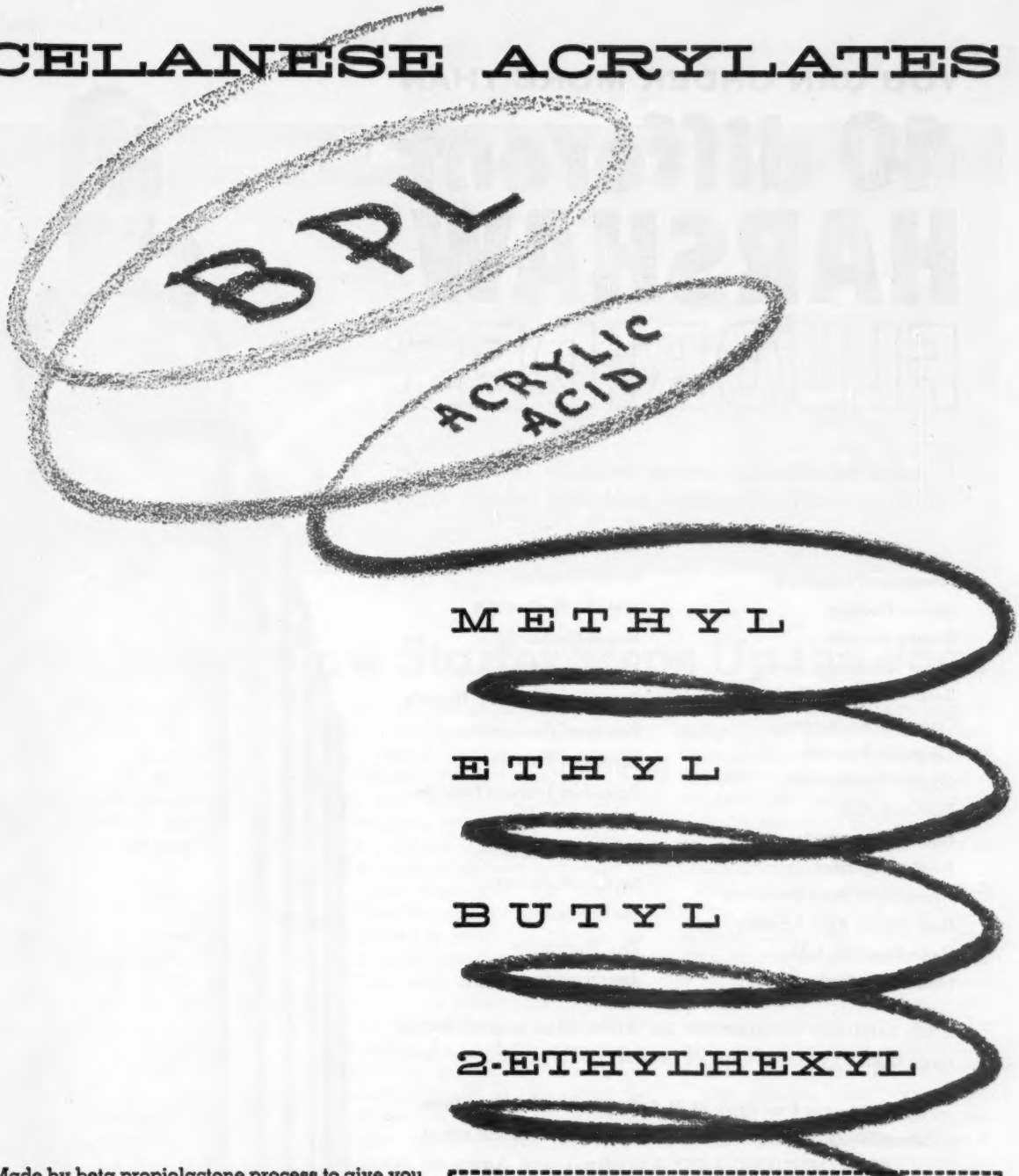
•

Limited marketing of a high analysis fertilizer containing 30% nitrogen and 10% phosphorus is now under way by Spencer Chemical Co. This makes Spencer the first commercial producer of the product (known as 30-10-0), although the Tennessee Valley Authority has turned out considerable developmental quantities. Spencer says it will maintain its pattern of distribution by marketing the product through mixed fertilizer dealers. Production will come from Spencer's Jayhawk Works near Pittsburg, Kan., using a company-developed process.

SELECTED PRICE CHANGES—WEEK ENDING FEBRUARY 27, 1961

	Change	New Price
UP		
Palm oil, dbl. dist. dms.	$0.0075	$0.16
Soybean oil, crude, tanks, Decatur	0.005	0.12625
Tin metal, (Straits)	0.02	1.03

CELANESE ACRYLATES



Made by beta propiolactone process to give you unexcelled purity of product. Send for technical literature.

Celanese®

Celanese CHEMICALS

For a complete description of Celanese Chemicals, Please refer to our Product Index in current issues of *Chemical Materials Catalog* or *Chemical Week Buyer's Guide*.

Celanese Chemical Company is a Division of Celanese Corporation of America.

Celanese Chemical Company, Dept. 552C,
180 Madison Avenue, New York 16, N.Y.

Please send technical literature on Celanese Acrylates.

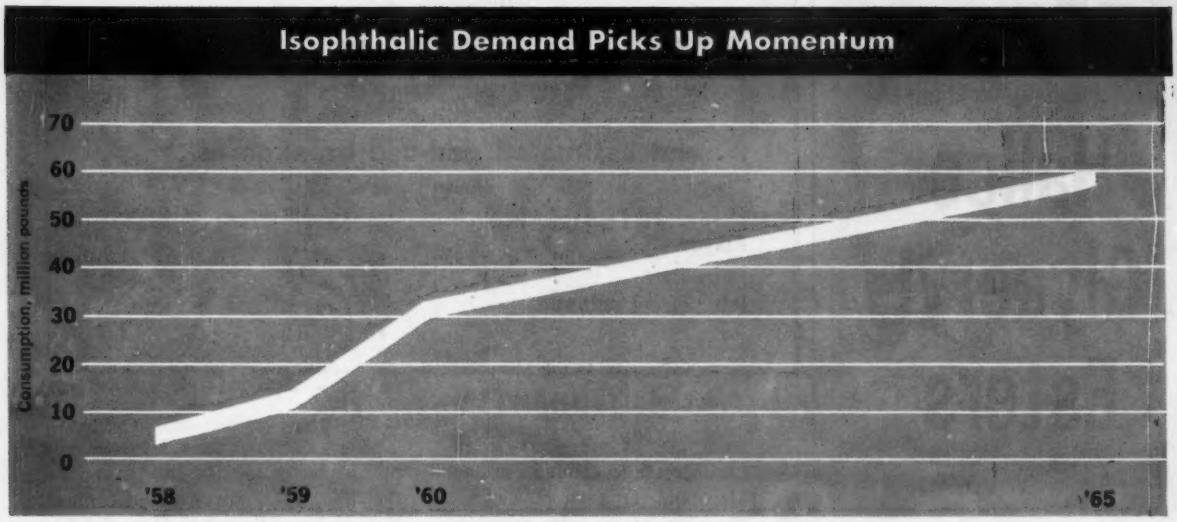
NAME_____ TITLE_____

COMPANY_____

ADDRESS_____

CITY_____ ZONE____ STATE_____

Canadian Affiliate: Canadian Chemical Company Limited, Montreal, Toronto, Vancouver • *Export Sales:* Amcel Co., Inc., and Pan Amcel Co., Inc., 180 Madison Avenue, New York 16



Isophthalic: Slow Starter Steps Up the Pace

After getting off to a slow start (chart), isophthalic acid—a dibasic acid that competes against phthalic anhydride for use in polyesters, alkyds, other applications—this week is offering the solidest evidence yet of having attained full-fledged commercial stature.

• California Chemicals Oronite Division (San Francisco), first commercial producer of isophthalic acid, tells CHEMICAL WEEK that it's currently operating its Richmond, Calif., plant at full capacity—and selling all output. (Although design capacity is 50 million lbs./year, actual capacity is thought to be 35-40 million lbs.) Moreover, the firm says it's now seriously considering construction of an additional isophthalic unit. Oronite says surveys are now in progress to determine the location, size, and timing of new units.

• Amoco Chemical (subsidiary of Standard Oil of Indiana), after lengthy shakedown problems, recently reported it is now offering commercial quantities of high-quality isophthalic acid from its Joliet, Ill., plant.

• Intrigued by the potential of isophthalic, a number of prospective producers are said to be actively studying the market. Two firms most frequently mentioned: Cosden (Big Spring, Tex.) and Sinclair. When queried by *CW* on isophthalic plans, Cosden declined to comment and Sinclair denied any plans to produce isophthalic acid. However, both Cosden and Sinclair will have excess meta-xylene, precursor of isophthalic acid, available for sale or upgrading by the end of this year.

Record Year: Last year was isophthalic's best one by far since it was introduced by Oronite in '56. Thanks to an assist from the steel slump, isophthalic acid chalked up a record year in '60 as sales hit the 31 million lb. mark. This was double '59 sales of 15 million lbs., and five times the 6 million lbs. sold in '58. Oronite has accounted for all of this output up until the last quarter of '60 when Amoco started shipping commercial quantities.

And isophthalic acid use should continue to spiral upward to reach at least 60 million lbs. in '65. Reason: usage in polyesters and alkyd resins, major consumer of isophthalic, is expected to increase. Moreover, if certain new markets develop—isophthalic-based polyamides is one such possibility—demand could rise much higher in the next few years.

And these predictions for isophthalic growth should hold even when phthalic anhydride becomes plentiful again. It's no secret that until '59 Oronite was finding it slow going in trying to win widespread acceptance for isophthalic. It's true that Oronite had gained some good—and loyal—customers for isophthalic. But many polyester and alkyd producers simply did not want to make the effort to switch from phthalic.

However, when the steel strike hit in '59, naphthalene (raw material for phthalic anhydride) became short. Phthalic anhydride, in turn, was soon in scant supply. And the supply situation got tighter in '60 as lagging steel demand continued to depress the amount of naphthalene available from coke ovens (*CW, Dec. 10, '60, p. 85*).

The situation forced many polyester and alkyd producers to try isophthalic. Many who tried it liked it. As a result, even with new petroleum naphthalene now coming onstream (*CW Market Newsletter, Feb. 25*), and with abundant supplies of phthalic anhydride just around the corner, isophthalic appears to have found a firm place for itself in the resin industry. And it is looking forward to new growth.

Potential in Polyesters: Fastest-growing potential for isophthalic is in polyester resins (*CW, April 18, '59, p. 121*). In '60, polyesters utilized 10 million lbs. of isophthalic—about one-third of total iso sales. By '65

Isophthalic producers, estimated capacities

Million pounds/year

Oronite	Richmond, Calif.	40
Amoco	Joliet, Ill.	25
	Total	65

. . . and estimated end-use breakdown

Million pounds

	'60	'65
Alkyds	17	23
Polyesters	11	35
Plasticizers and other	3	2
Total	31	60

isophthalic use in polyesters is expected to increase to about 35 million lbs. This would represent 60% of the 60 million lbs. of iso sales projected for that year.

This increase is expected to come from both new users of isophthalic as well as soaring demand forecast for polyesters. Example: reinforced plastics, a big consumer of polyesters, achieved sales of 255 million lbs. in '60, accounting for sales of about 150 million lbs. of polyesters. And reinforced plastic sales are expected to double by '65 (*CW, Feb. 18, p. 131*).

Present polyester producers say they find isophthalic definitely superior to phthalic anhydride for polyester manufacture, and plan to increase their requirements substantially in the years ahead. One such customer is R. S. Morrison, president of Molded Fiber Glass Companies (Ashtabula, O.)—the country's largest fabricator of fiber glass-reinforced plastics, which also makes polyesters. According to Morrison, isophthalic-based resins give greater toughness, greater strength at elevated temperatures, better reverse impact strength, less crazing and improved weathering characteristics compared with an equivalent phthalic anhydride polyester. In addition, iso offers advantages in matched metal die molding of reinforced plastics.

Morrison also states, "Irrespective of the phthalic anhydride supply picture, Molded Fiber Glass Companies will continue to use iso exclusively for its production of car and truck bodies, boats, panels, tanks, trays and other products."

Other polyester manufacturers admit to being sold on iso as a raw material for polyesters. Chemical Process Co. (Redwood City, Calif.), one of the first companies to produce iso-based polyesters, says it expects its use of the chemical to quintuple by '65.

Alkyds Uncertain: Although alkyds consumed the major share of iso output in '60, about 17 million lbs., no big growth is seen for iso in this area. By '65, consumption of iso in alkyds is expected to edge up to about 23 million lbs.—an increase of only 6 million over the 17 million lbs. consumed in '60.

Reason for projecting slow growth: the advantages of using iso-based alkyds are considered marginal in many cases, say some users. The most striking advantages, according to satisfied customers, are iso's general resistance to abrasion, corrosion, humidity, detergents and chemicals. Also, since isophthalic alkyds can be made at a longer oil length than the equivalent ortho resins, cheaper resins can be made when the price of tall oil is down.

But at the same time, iso alkyds reportedly present some processing and property disadvantages. For example, a longer cook time at higher temperatures cuts down production capacity per kettle. Iso's higher melting point is said to make it difficult to use in the molten state, which would help cut handling costs. And since iso is harder to get into solution, processing difficulties are encountered. In addition, iso alkyds are reportedly of poorer clarity than the

INDUSTRIAL CHEMICALS

ANHYDROUS AMMONIA – This basic industrial chemical is available in commercial and refrigeration grades from three strategically located plants.

AQUA AMMONIA (NH_4OH) – An economical source of nitrogen and an easily handled alkali.

AMMONIUM NITRATE – In pelleted form. Typical analysis: Ammonium Nitrate content – 96% or more.

AMMONIUM NITRATE SOLUTIONS – NFS-83 and NFS-50. Ammonium nitrate-water solutions containing respectively 83% and 50% NH_4NO_3. For explosives, fluid catalysts, pharmaceutical applications.

AMMONIUM SULFATE – Diverse uses include fireproofing, fertilizers, leather tanning.

ETHYLENE OXIDE – Rocket propellant, fumigant, fungicide, chemical intermediate.

ETHYLENE GLYCOL – Also Di- and Tri-. Humectants, plasticizers, scrubbing solutions for gas dehydration, scores of other industrial uses.

ETHANOLAMINES – MEA, DEA, and TEA. Versatile, reactive, easy to handle. TEA available in 98% and commercial grades.

FORMALDEHYDE – Available as 37% Inhibited, 37% Low-Methanol, 45% Low-Methanol, 50% Low-Methanol.

METHANOL – 99.85% pure. In barge, tank car, and tank-truck quantities.

NITROGEN TETROXIDE – High energy oxidant for liquid rocket propellants. Easy to handle and store.

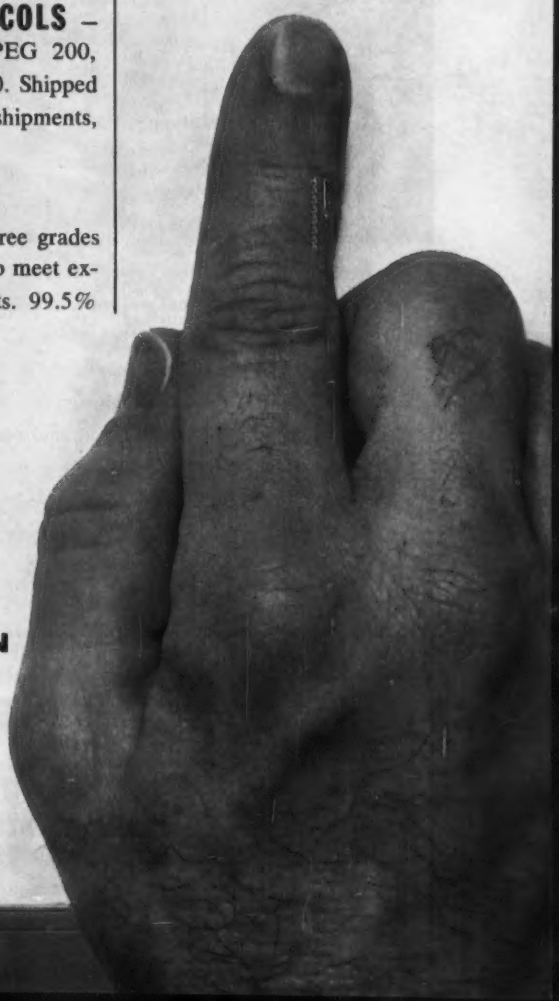
POLYETHYLENE GLYCOLS – Available in six forms: PEG 200, 300, 400, 600, 1000, 1450. Shipped in tank car or combination shipments, tankwagon and drums.

SODIUM NITRATE – Three grades – coarse, medium, fine – to meet exacting process requirements. 99.5% pure.

UREA – Multiplant production assures unfailing supply of this basic chemical in crystal and pelleted form.

U-F CONCENTRATE-85 – Highly concentrated solution of urea (25%) and formaldehyde (60%). Easy to handle, economical source of these materials for resins and adhesives.

For specifications and local offices, see our insert in Chemical Materials Catalog, page 272A and in Chemical Week Buyers Guide, page 27.



BASIC TO AMERICA'S PROGRESS

Allied Chemical

NITROGEN DIVISION
Dept. AP 10-7-3, 40 Rector Street
New York 6, New York

2819

ortho variety. Though work is needed before the alkyd manufacturers can completely assess the value of isophthalic acid, right now it looks as if this raw material has earned itself a permanent but small piece of the alkyd market. Consensus: even a loosening of the phthalic anhydride supply situation should not loosen iso's foothold as a raw material for specialty alkyd resins where the property advantages outweigh the processing difficulties.

In another application, about 3 million lbs. of isophthalic acid went into plasticizer manufacture in '60. But because of disadvantages—e.g., poor compatibility, isophthalic use in plasticizers is expected to shrink or even disappear completely when phthalic anhydride becomes readily available.

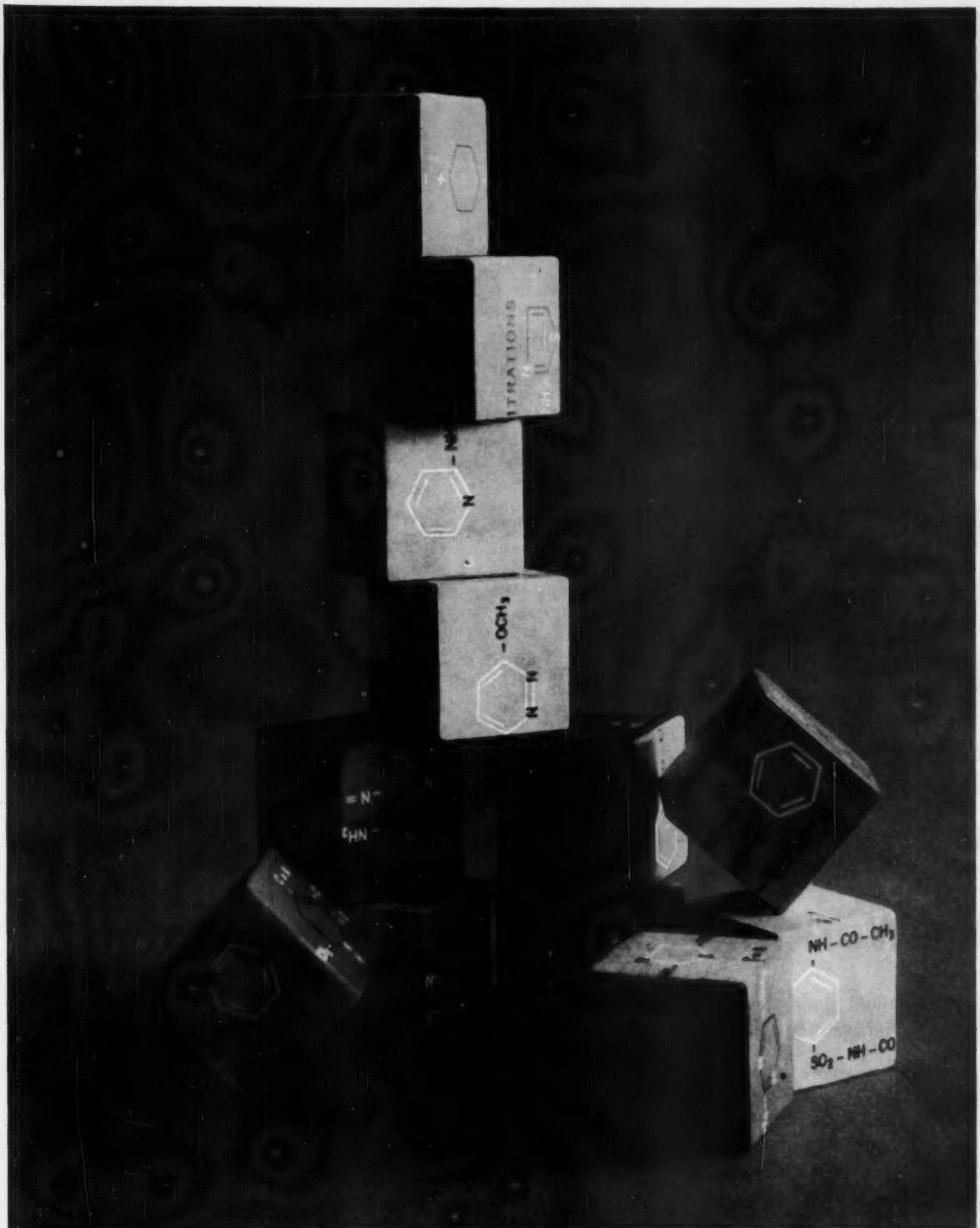
Pointing Up Potential: There are several projects now in the development stage that could boost isophthalic demand if they prove out.

- California Chemical has had under development for several years a polyamide, called MXD6 made by reacting meta-xylylene diamine and adipic acid. Isophthalic acid is the logical precursor of meta-xylylene.
- A polyamide, called HT1 by its producer, the Du Pont Co. This polymer is being actively promoted in both military and civilian applications. High on the list of civilian applications is tire cord. Although HT1's composition is undisclosed by Du Pont, industry experts state that this product is based on isophthalic acid.

Gauging Capacity: Although present isophthalic acid capacity is now adequate to handle current needs, more will be needed if demand should suddenly spurt. Between the two producers, Oronite and Amoco, capacity is estimated at 65 million lbs./year. The Oronite plant, although stated to have a capacity of 50 million lbs./year, is believed by technical observers to have a capacity closer to 40 million lbs./year.

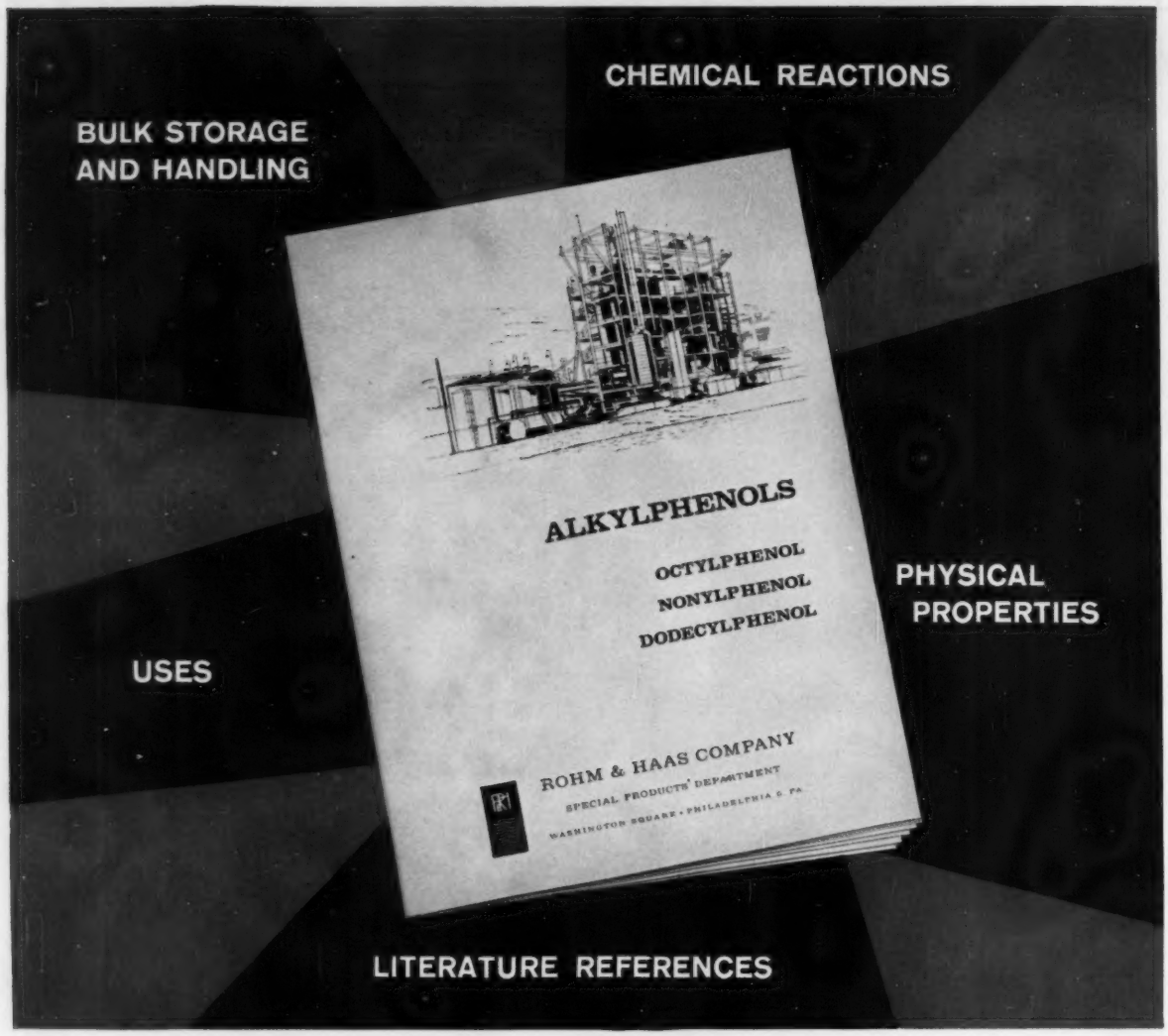
Amoco's plant capacity is estimated at 20-25 million lbs./year. This unit is designed to produce phthalic anhydride, terephthalic and isophthalic acids. Total rated capacity for all three products: 60 million lbs./year.

Whether new producers enter the market remains to be seen. But one thing is sure: current producers are anticipating a continued sales surge.



NITROSATIONS, CHLOROSULFONATIONS, HYDROGENATIONS...STUMBLING BLOCKS OR BUILDING BLOCKS? Perhaps the Cyanamid Custom Synthesis Service can help. Whether you need to effect such difficult chemical reactions on a commercial scale, or to refine a crude product for use in specialized procedures, let us do it, or help "work out" the procedures. Flexibility and diversity of experience and facilities have enabled us to produce commercially, a variety of unique products including uracil, p-chlorobenzenesulfonamide and bis metanitrophenyldisulfide. And we can handle—concurrently, and with ease—pilot-plant, semi-commercial, and full-scale production of many chemicals, which might be difficult to procure or expensive to produce within your own organization. Why not consult, confidentially, with the Custom Synthesis Service of Cyanamid Fine Chemicals Department.

CYANAMID | AMERICAN CYANAMID COMPANY • FINE CHEMICALS DEPARTMENT / Pearl River, New York.

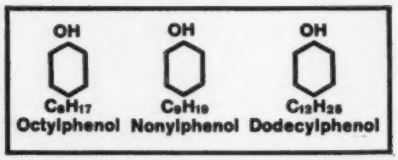


Working guide to the alkylphenols

Low cost and a wide range of useful reactions make alkylphenols valuable intermediates for many types of products.

To help you explore the possibilities of octylphenol, nonylphenol, and dodecylphenol, Rohm & Haas offers this bulletin. It provides data on physical properties, storage and handling, applications, and detailed information on many reactions. These reactions include etherification, condensation with aldehydes and sulfur halides, salt formation, sulfonation, nitration, halogenation, and esterification.

Write to Dept. SP-10 for your free copy of this 18-page booklet. Samples of the three Rohm & Haas alkylphenols are also available.



ROHM & HAAS
PHILADELPHIA 5, PA.

ALKYLPHENOLS

Analysis Goal: to Catch an Unwanted Atom

Trace analysis—the business of spotting and measuring the few unwanted atoms in an otherwise pure solid (illustration)—is in the spotlight at this week's Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy.

Among the instruments attracting the most attention: the first commercial atomic absorption spectrometer made in the U.S., offered by Perkin-Elmer Corp. (Norwalk, Conn.); and a mass spectrometer that will analyze solids, made by Consolidated Electrodynamics Corp. (Pasadena, Calif.), a subsidiary of Bell & Howell. The first is a relatively low-cost ($8,200) unit for improved sensitivity in analyzing troublesome elements (e.g., zinc), while the second is a $100,000 system that gives researchers much improved across-the-board sensitivity.

Though conventional spectroscopic and other methods allow routine analyses in the range of parts per million, the ultrahigh-purity demands of the semiconductor industry and of metallurgical researchers in many industries has pushed sensitivity requirements into the parts-per-billion range.

As a result, producers of high-purity metals often find they can make products of higher purity than their analytical techniques permit them to prove. Thus specifications lag behind actual obtainable purity — creating pressure from researchers and sales people alike for better analytical techniques.

Emission Switch: An atomic absorption spectrometer is essentially the reverse of a conventional emission spectrometer, which measures the intensity of the spectral lines produced by emission from highly excited atoms of sample (in an arc or spark). In the new system, a cathode made of the same metal as the impurity in question emits its characteristic radiation. Amount of impurity in a vaporized sample is obtained by measuring the amount of the radiation it absorbs. Sensitivity for many elements is improved because absorption involves the vast majority of atoms in the trace material, while relatively few atoms are excited enough to be measured by emission.

Although the method can be used to give highly sensitive measurements of given elements, it does have shortcomings. One is that it requires the sample to be put in solution before it is vaporized. This can be a real problem with many refractory metals, and use of reagents always introduces the problem of possible contamination. However, the technique is speedy, can be used for routine control analyses for known impurities.

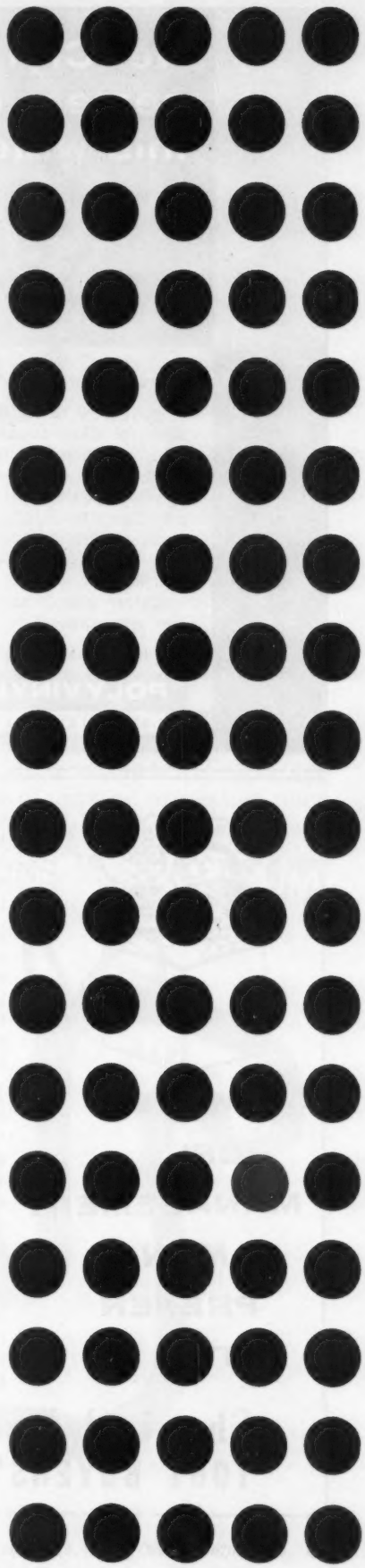
In addition to Perkin-Elmer, Hilger & Watts (London) and Optica, Inc. (Milan, Italy) are also making atomic absorption units. Each firm holds a license from Australia's Commonwealth Scientific & Industrial Research Organization (Melbourne), where the technique was developed. (Exclusive sales agent for Optica in the U.S. is National Instrument Laboratories, Washington, D.C.)

Normally limited to the analysis of one element at a time, the technique can be used to study up to six elements at once, says Optica.

Top Sensitivity: Application of the mass spectrometer to solids analysis holds promise of being the most sensitive broad-use instrument. A spark discharge is used to volatilize the solid sample, while a double-focusing system separates the ions by mass. Previously useful only for liquid and gaseous samples, the mass spectrograph has sensitivities below 1 ppm. for most elements and is capable of reaching the parts-per-billion range.

Last year, CEC disclosed that it has sold 10 of the systems, but that delivery could be made only as the machines were built. To date, units have been delivered to Wright-Patterson Air Force Base (Dayton)—for whom the system was developed by CEC—U.S. Steel Co. and General Telephone & Electronics Laboratories. Esso Research & Engineering Co. also has one of the systems, but it is not using it on solids analysis.

Britain's Metropolitan-Vickers Electrical Co. Ltd. (Manchester) also pro-



Lone colored dot symbolizes rigorous challenge facing trace analysis workers.

duces a similar unit, which has recently been offered in this country by Picker X-Ray (White Plains, N.Y.).

Main drawback of this kind of machine, in addition to its cost, is its relative slowness, which limits it largely to research use.

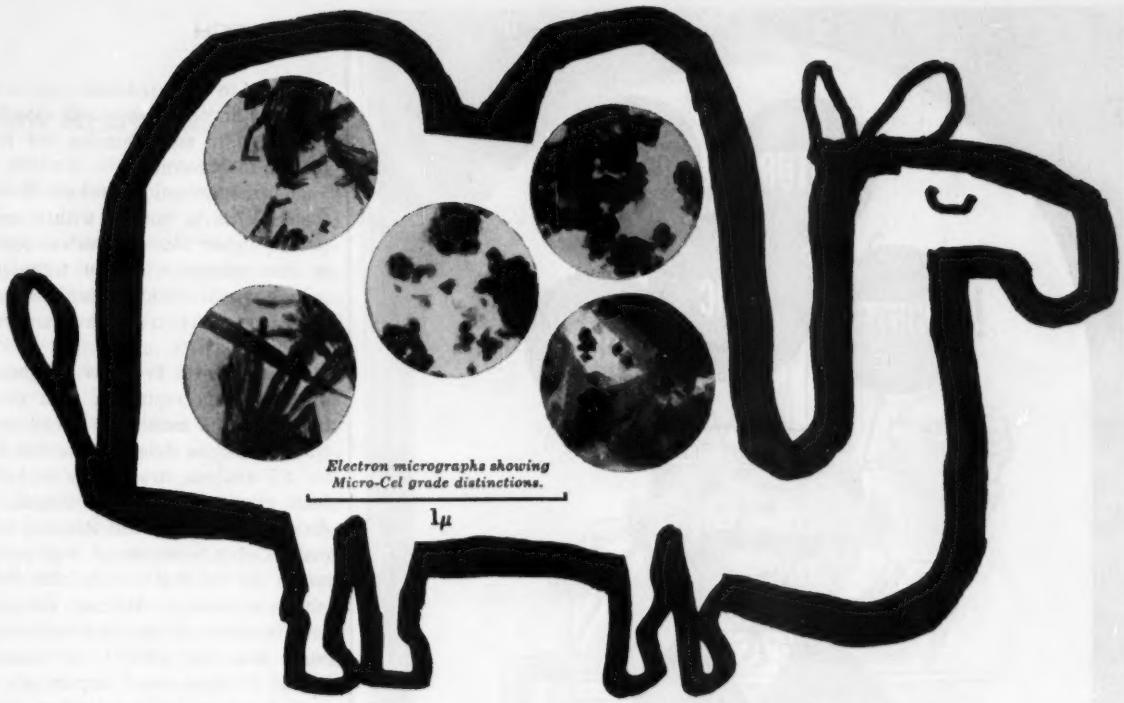
Upgrading Emission: Conventional emission equipment can also be made to give improved results—often in the parts-per-billion range—by some relatively simple changes in technique devised by George Morrison and coworkers of General Telephone's Bayside, L.I., N.Y., laboratories.

Most important change is use of specially chosen atmospheres—generally argon—in place of air. Using argon permits better temperature control and use of higher amperage. Morrison notes that a small chamber can be made or obtained to fit onto existing equipment at very little cost; and argon is a common laboratory gas. Improvements in the system's optics and cutting away part of the graphite sample-holding electrode (to minimize conduction of heat away from the sample) are the other alterations.

Among the most dramatic improvements in sensitivity brought about by this method are mercury and phosphorus measurements of 5 parts per billion, compared to previously obtainable 10-50 ppm. (an improvement of more than three orders of magnitude). Of particular importance to the semiconductor industry, boron levels of 5 ppb. in silicon can be detected by this technique. This allows the processor to check on purity of the material much earlier than the final resistivity check on the refined single crystal.

Radioactive Approach: Probably the best known and most used of the ultrasensitive (parts per billion) methods is activation analysis. The most common type, neutron activation, is carried out by subjecting the sample to high-flux neutron bombardment, then isolating the radioactive isotope formed by the element in question and measuring the amount so transformed by a scintillation counter.

Although machine source bombardment is possible, sensitivity of the method is proportional to the neutron flux, which to date is highest in nuclear reactors. Thus the advantages of the method—sensitivity, small capital investment and lack of contamination problems once the sample has been



Micro-Cel holds water like a camel!

Micro-Cel®, Johns-Manville's new line of synthetic calcium silicates, absorbs up to 6 times its weight in water . . . remains a free-flowing powder after absorbing triple its weight in liquid. 4½ lbs. bulk to a full cu. ft. Costs only 7 to 8¢ a lb. (F.O.B.). Surface areas up to 175 sq. m/gr. Micro-Cel, available in several grades and offering a wide range of physical properties, may provide the cost-cutting answer to your formulating problems. For further information, samples and assistance, mail in coupon!

JOHNS-MANVILLE JM
Celite Division

1961

JOHNS-MANVILLE, Box 14, New York 16, N. Y.
In Canada: Port Credit, Ontario.

☐ Please send additional data.

☐ Please send free sample of suitable grade of Micro-Cel for use in:_____

☐ Have local Sales Engineer contact me.

Name_____ Position_____

Company_____

Address_____

City_____ Zone____ County_____ State____

subjected to bombardment—are countered by inconvenience and slowness of having to send samples out to a reactor for treatment.

Neutron activation works well with many elements, but not with some—notably lighter elements such as boron. A new proton activation technique, using a synchrocyclotron for bombardment, is useful for boron analysis, however.

Problems of a Producer: Producers of high-purity materials, with much less time (and money) to spend on a control analysis than a researcher has for his analysis, are clearly excluded from using some of these techniques. American Smelting and Refining Co., maker of a number of high-purity metals at its South Plainfield, N.J., labs, is an example. Although the company is convinced that its products are purer than the 99.999+% claimed (under 10 ppm. total impurities), it prefers not to make a blanket claim that total impurities are under 1 ppm. (which would be necessary to add one more "9" to the specification).

Because different elements are most easily detected by various methods, ASARCO uses several different instruments for its analyses. Most metals are measured to less than 1 ppm. by emission spectroscopy, while similar sensitivity for alkali metals is obtained by flame photometry. Elements such as sulfur and selenium are best measured by colorimetric techniques. And gases are detected with a mass spectrometer and a Leco oxygen analyzer. More costly and time-consuming instruments would probably be out of the question for the company.

When one element is of particular importance, analytical techniques can be sharpened to get an extra order of magnitude or two of sensitivity for that element, but such specific improvement is generally done at the expense of sensitivity to other elements. A general producer that does not control the use of the product (and often does not even know what it is being used for) has to do the best across-the-board analysis possible within reasonable time and economic limits.

However, the constant honing of established techniques and the continued development of new ones gives hope that the user of routine analysis can step into the same rarified levels already attained by the research chemist.

New Army R&D Head

Richard Morse, president of National Research Corp. until becoming the Army's Director of Research and Development in '59, has been appointed Assistant Secretary of the Army (Research and Development).

Morse's newly created position will have jurisdiction over all of the Army's billion-dollar-a-year R&D programs. These programs had previously been divided among several agencies responsible directly to the Secretary of the Army.

Together with Lt. Gen. Arthur Trudeau, Chief of Research and Development, and the Army Scientific Advisory Panel, Morse has recommended and seen completed a number of changes in the organization of Army R&D. One of the most recent: shift of the former Office of Ordnance Research to Trudeau's command (*CW Technology Newsletter, Jan. 28*).

Atomic Shielding Coop

Two CPI firms have joined in a cooperative arrangement to develop and manufacture light-weight atomic radiation shielding. Michigan Chemical Corp. (St. Louis, Mich.) and Haveg Industries, Inc. (Wilmington, Del.) will work exclusively with each other in the new enterprise.

Michigan Chemical has a series of thin, rare-earth thermal-neutron shielding materials on which it has applied for U.S. patents. Haveg is a specialist in combining and fabricating all types of plastics and organic and inorganic fibers and fillers.

The research departments of the two companies will continue to carry out an extensive program of development, and research assignments will also be given to outside laboratories.

EXPANSION

• The Goodyear Tire & Rubber Co. is starting construction on a $1.5-million expansion of its Akron, O., research laboratory. A new three-story wing containing 25,500 sq.ft. will enlarge the laboratory by 30%. It will be completed by the end of '61.

• Colgate-Palmolive Co. has reorganized its research effort to prepare for a research expansion when

Chemical Week

ADVERTISERS' INDEX

ALLIED CHEMICAL CORP., NITROGEN DIV. Agency—G. M. Basford Co. 65

AMERICAN AGRICULTURAL CHEMICAL CO., THE Agency—Marsteller, Rickard, Gebhardt & Reed, Inc. 2

AMERICAN AIR LIQUIDE, INC. Agency—Stanfield, Johnson & Hill, Ltd. 36

AMERICAN CYANAMID CO. Agency—Erwin Wasey, Ruthrauff & Ryan, Inc. 67

AMERICAN MINERAL SPIRITS CO. Agency—Leo Burnett Co., Inc. 38-39

AMERICAN OPTICAL COMPANY Agency—Fuller & Smith & Ross, Inc. 19

AMOCO CHEMICAL CORP. Agency—D'Arcy Advertising Co. 8-9

ANSUL CHEMICAL CO. Agency—Brad Sebstad, Inc. 42

BADISCHE ANLIN & SODA FABRIK A.G. 57

BLOCKSON CHEMICAL CO. Agency—Wm. Balsam Adv. 7

CABOT CORP. Agency—Larcom Randall Adv., Inc. 3rd cover

CELANESE CORP. OF AMERICA Agency—Ellington & Co., Inc. 61

CHEMICAL CONSTRUCTION CORP. Agency—Van Brunt & Co. 31

CRANE CO. Agency—The Lampert Agency, Inc. 44-45

DAVISON CHEMICAL DIV., W. R. GRACE & CO. Agency—Van Sant, Dugdale & Co., Inc. 50

DAY CO., THE J.H. Agency—The Keelor & Stites Co. 10

FMC CHLOR-ALKALI DIV. OF FOOD MACHINERY & CHEMICAL CORP. Agency—James J. McMahon Adv. 2nd cover

GENERAL AMERICAN TRANSPORTATION CORP. Agency—Edward H. Weiss & Co. 40

GENERAL SERVICES ADMINISTRATION Agency—Advertising, Inc. 34

GOODYEAR TIRE & RUBBER CO. Agency—Kudner Adv. Agency 1

GULF OIL CORP. Agency—Ketchum, MacLeod & Grove, Inc. 28

HALL CO., THE C. P. Agency—Cruttenden Advertising 64

HARCHEM DIV. WALLACE & TIERNAN, INC. Agency—Barber & Drullard, Inc. 72

HARSHAW CHEMICAL CO. 62

HERCULES POWDER CO. Agency—Fuller & Smith & Ross, Inc. 37

JEFFERSON CHEMICAL CO. Agency—Robinson-Gerard-McGary, Inc. 12-13

JOHNS-MANVILLE CORP. Agency—Cunningham & Walsh, Inc. 71

LOUISIANA DEPT. OF COMMERCE & INDUSTRY Agency—Gillis & Hundemer & Fetty, Inc. 66

LUCIDOL DIV., WALLACE & TIERNAN, INC. Agency—Barber & Drullard, Inc. 72

MAAS & CO., A. R. Agency—M-A Advertising Agency 27

MARATHON, A DIV. OF AMERICAN CAN CO. Agency—Maercklein Advertising 48

METAL & THERMIT CORP. Agency—Marsteller, Rickard, Gebhardt & & Reed, Inc. 43

MICHIGAN CHEMICAL CORP. Agency—Aves, Shaw & Ring, Inc. 55

MONSANTO CHEMICAL CO. Agency—Gardner Adv. Co. 14

NOPCO CHEMICAL CO. Agency—Gray & Rogers Adv. 4

OLIN MATHIESON CHEMICAL CORP. Agency—Van Sant, Dugdale & Co., Inc. 49

PENNSYLVANIA INDUSTRIAL CHEMICAL CORP. Agency—Downing Industrial Adv., Inc. 11

PERMUTIT DIV., PFAUDLER PERMUTIT, INC. Agency—The Rumrill Co., Inc. 15

POLYVINYL CHEMICALS, INC. Agency—Creamer, Trowbridge & Case, Inc. 70

POWELL CO., THE WILLIAM Agency—The Ralph H. Jones Co. 33

ROHM & HAAS CO. Agency—Arndt, Preston, Chapin, Lamb & Keen, Inc. 68

SHELL CHEMICAL CO. Ogilvy, Benson & Mather, Inc. 16

SILICONES DIV. UNION CARBIDE CORP. Agency—J. M. Mathes, Inc. 35

TITANIUM PIGMENT CORP., SUB. OF NATIONAL LEAD CO. Agency—Doyle, Kitchen & McCormick, Inc. 4th cover

UNION CARBIDE CHEMICALS, CO., DIV. OF UNION CARBIDE CORP. Agency—J. M. Mathes, Inc. 58

UNION CARBIDE PLASTICS CO., DIV. OF UNION CARBIDE CORP. Agency—J. M. Mathes, Inc. 6

WEIGHING & CONTROLS, INC. Agency—The Roland G. E. Ullman, Inc. 32

ADVERTISING STAFF

Atlanta 9 ..... Michael Miller 1375 Peachtree St., N.E. TRinty 5-0523

Boston 16 ..... Paul F. McPherson, Copley Square, COngress 2-1160

Chicago 11 ..... Alfred D. Becker, Jr., R. J. Claussen, 520 N. Michigan Ave., MOhawk 4-5800

Cleveland 13 ... H. J. Sweger, Duncan C. Stephens 1164 Illuminating Bldg., 55 Public Square, SUperior 1-7000

Dallas 1 ..... Gordon Jones, John Grant 901 Vaughan Bldg., 1712 Commerce St., Riverside 7-9721

Detroit 26 ..... H. J. Sweger, Jr., 856 Penobscot Bldg., WOodward 2-1793

Frankfurt/Main ..... Stanley Kimes, 85 Westendstrasse, Germany

Geneva ..... Michael R. Zeynel 2 Place du Port, Geneva, Switz.

Houston 25 ..... Gene Holland W-724 Prudential Bldg., JAckson 6-1281

London W1 ..... E. E. Schirmer, N. Murphy, McGraw-Hill House, 34 Dover St., England.

Los Angeles 17 ..... Robert Yocom, 1125 West Sixth St., HUntley 2-5450

New York 36 ..... Charles Haines, B. A. Johnson, Paul F. McPherson, Charles F. Onasch, L. Charles Todaro, 500 5th Ave., OXford 5-5959

Philadelphia 3 .... William B. Hannum, Jr., J.E.B. Ladouceur, 6 Penn Center Plaza, LOcust 8-4330

Pittsburgh 22 ..... Duncan C. Stephens, 4 Gateway Center, EXpress 1-1314

Portland 4 ..... Scott B. Hubbard Room 445, Pacific Bldg.

St. Louis 8 ..... R. J. Claussen 3615 Olive St., Continental Bldg., JEfferson 5-4867

San Francisco 4 ..... William C. Woolston 255 California St., Douglas 2-4600

the firm's new laboratories in New Brunswick, N.J., are completed. Major change was formation of a centralized Research and Development Dept., under the full responsibility of John R. Brown, Jr., vice-president for research and development. Technical activities will be divided into two areas: biological and chemical, under the supervision of separate research directors.

• The Chemicals Research Division of Esso Research & Engineering Co. has switched from functional to product organization. The old headings of exploratory, product application and process development have given way to plastics, elastomers and general chemical units, each of which is responsible for all research functions within its area.

• Aerojet-General Nucleonics will expand its research effort at a site adjoining its present San Ramon, Calif., location. Chemonuclear, nuclear-electronic, metallurgical and plasma physics labs are planned.

• Solid State Materials Corp. has moved into new quarters at the East Natick (Mass.) Industrial Park. The firm is engaged in research on and production of semiconductor materials and other crystals.

• International Business Machines Corp. has started construction of a 58,000-sq.ft. laboratory at Ruschlikon, Switzerland. About 100 persons will be moved from leased quarters in Zurich to the new lab when it is completed in '62. Included in the research done by the group is work on thin magnetic films and semiconductor materials.

• Battelle Memorial Institute (Columbus, O.) reports an all-time high in the dollar volume of research performed: $23,450,000 for over 650 clients in '60. In addition, the firm's European laboratories at Geneva and Frankfurt chalked up $5 million worth of research.

• Synthetic Polymers (2012 Lake Ave., Whiting, Ind.) is a new consulting firm covering plastics, fibers, intermediates and monomers.

• Meta-Chem Laboratories, Inc. (5820 Harvey Wilson Dr., Houston) is a newly formed research and analytical testing laboratory.

• Quartz Radiation Corp. (Newark, N.J.) has formed a Product Research Dept. to develop new equipment made from quartz and other silicas.

Tracers

TO THE CHEMICAL PROCESS INDUSTRIES

Published: each Saturday—closes 11 days in advance.

Rate—$5.00 per line ($1.50 per line for position wanted ads), minimum 3 lines. Allow 5 average words as line; Count one half line for box number.

ADDRESS BOX NO. REPLIES TO:
BOX NO.———
Classified Adv. Div. of this Publication
Send to Office nearest you.
P.O. BOX 12, New York 36, N. Y.
520 N. Michigan Ave. Chicago 11, Ill.
255 California St., San Francisco 11, Calif.

POSITIONS VACANT

Opening for research and development chemist experienced in manufacture and use of wax compounds, wax emulsions, resins, polymer dispersions, cleaners and household chemicals in a manufacturing company laboratory located in the Middle West. Apply by letter, enclosing photograph and giving full details of education and experience. All replies will be confidential. P-6203, Chemical Week.

Executive Chemist to organize technical group, consisting of control, applied R & D. Duties will also include some technical sales contacts. Plastic experience preferred. This position ideal for man who likes diversification, and opportunity dependent on individual merit. Salary open. Many security benefits. Our people know of this vacancy. Location—Baltimore. P-6194, Chemical Week.

Vice-President Wanted—To take charge of sales for growing vinyl resin and compound plant. Other polymers coming. Opportunities like this come seldom. Send reply to Great American Plastics. Co., Nashua, New Hampshire.

SELLING OPPORTUNITY AVAILABLE

Chemical Salesmen: Prime manufacturer of surfactants and quaternary ammonium compounds has opening for experienced salesman with degree in chemistry. Some traveling. Salary and bonus arrangement. Send resume detailing experience and salary desired. Our employees know of this ad. Send replies to Intex Chemical Corp., 167 Main Street, Lodi, N.J.

SELLING OPPORTUNITY WANTED

Leaving for six weeks July 15 for Italy, Switzerland, France and England. Have time and ability to represent your firm, contacts, buying, selling. C. H. Taylor, Prudential Bldg., #1102, Houston 25, Texas.

If you are a manufacturer seeking new or added sales outlets—or if you are a manufacturer's agent or chemicals distributor with the capacity, time and energy to take on additional lines—make yor interests known in this column of Chemical Week. The right agent or jobber teamed up with the saleswise manufacturer makes the right combination for the hard selling days ahead. There's profit for both, which can be initiated through low-cost classified advertising. Write Employment Opportunities, Chemical Week. P.O. Box 12, New York 36, N.Y.

CONTRACT WORK WANTED

Custom Grinding-Ultra Fine or Coarse-Specialty or Volume Blending and Grinding service on unit or contract basis. Complete COz installation for Nylon, Teflon and Heat Sensitive Materials. A. Cramer Corp., 10881 S. Central Avenue, Box 682 Oak Lawn, Illinois.

We have available for a labor saving and cost reduction "Contract Your Packaging" program semi and fully automatic package filling machines for powders, nuts, bread crumbs, detergents, rodenticides, etc. CWW-6236, Chemical Week.

SPECIAL SERVICES

Do you ever buy Chemicals quietly? We do, confidentially, for undisclosed customers, one pound or a carload, domestic and foreign. Contact Chemicals International, Inc., Suite 1102 Prudential Bldg., Houston 25, Texas, JAckson 2-4141.

BUSINESS OPPORTUNITY

Progressive European Chemical Manufacturer with factories in both the Common Market area and European Free Trade area is interested in new chemical products for possible manufacture under license in Western Europe, such as derivatives of vegetable and animal oils, chemicals to be used in the plastics industry, the paint, varnish, and surface coating industries, soap and detergent industries. Principal will be here shortly for personal discussion. Reply to International Industrial Technical Services, Suite 816, 80 Boylston Street, Boston 16, Mass.

PROFESSIONAL SERVICES

Technical Guidance by Martin H. Gurley, Jr., Research Adv sory Service, RFD. 4 Lexington, Va. COngress 1-3294.

The Consulting Engineer. "By reason of special training, wide experience and tested ability, coupled with professional integrity the consulting engineer brings to his client detached engineering and economic advice that rises above local limitations and encompasses the availability of all modern developments in the fields where he practices as an expert. His services, which do not replace but supplement and broaden those of regularly employed personnel, are justified on the ground that he saves his client more than he costs him."

EQUIPMENT FOR SALE

60" dia. x 36 plate T316 stainless bubble cap column 42' high, dished heads. Perry, 1415 N. Sixth St., Phila. 22, Pa.

F.J. Stokes model #138J-16, 195 sq. ft. vacuum shelf dryer, (16) shelf, single door. Perry, 1415 N. 6th St., Phila. 22, Pa.

Marco-Niro portable laboratory type spray dryer, stainless steel. Perry, 1415 N. 6th St., Phila. 22, Pa.

Allis-Chalmers 5' x 5' ball mill, manganese liners, balls, scoop feeder, 75 HP motor & drive. Perry, 1415 N. 6th St., Phila. 22, Pa.

7' x 120' Allis-Chalmers rotary kiln, ¼" welded shell, 2-tires. Perry, 1415 N. 6th St., Phila 22, Pa.

WANTED/FOR SALE

This Tracer Section can be used whenever you are looking for or offering Equipment, Plants Supplies, Chemicals, Opportunities, Special Services. The rates are low—just call or write Classified Advertising Division, Chemical Week. P.O. Box 12, N. Y. 36, N. Y., LOngacre 4-3000.

BOOKS

Manual of Construction Management. For Chemical and Process Plant. National Schools of Construction. Publishers. Satsuma, Florida.

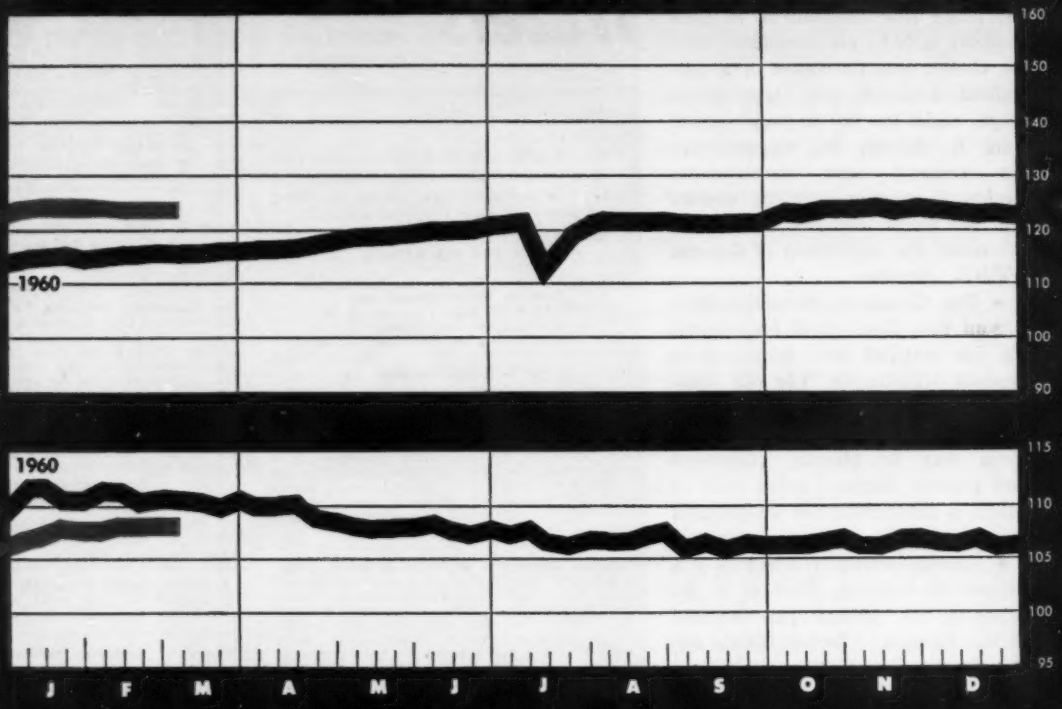
CHEMICALS WANTED

Wanted: Large volumes of alcohols, acids, oxygenated and chlorinated solvents, ethylbenzene, naphthalene, special refinery streams, surplus chemicals. Established marketing organization with petroleum and chemical following requires sources of supply for spot and continuing sales. Refiners Petroleum Co., 332 S. Michigan Ave., Chicago 4, Illinois, HA 7-5425.

MISCELLANEOUS

To Employers Who Advertise for Men: The letters you receive in answer to your advertisements are submitted by each of the applicants with the hope of securing the position offered. When there are many applicants it frequently happens that the only letters acknowledged are those of promising candidates. (Others do not receive the slightest indication that their letters have even been received, much less given any consideration.) These men often become discouraged, will not respond to future advertisements and sometimes even question if they are bonafide. We can guarantee that Every Advertisement Printed Is Duly Authorized. Now won't you help keep our readers interested in this advertising by acknowledging every application received, even if you only return the letters of unsuccessful applicants to them marked say, "Position filled, thank you." If you don't care to reveal your identity mail them in plain envelopes. We suggest this in a spirit of helpful co-operation between employers and the men replying to Positions Vacant advertisements. Classified Advertising Division, McGraw-Hill Publishing Company, "Put Yourself in the Place of the Other Fellow."

BUSINESS BENCHMARKS

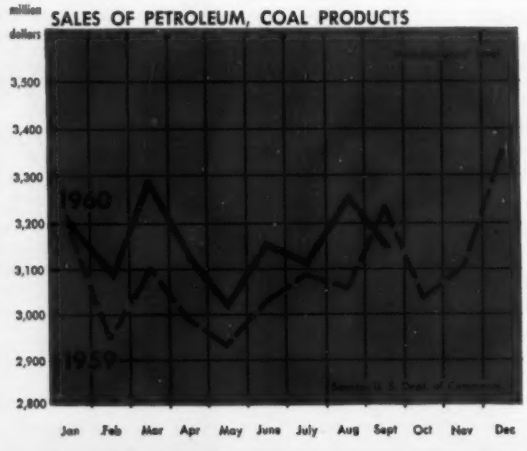


MARCH 4, 1961

WEEKLY BUSINESS INDICATORS	Latest Week	Preceding Week	Year Ago
Chemical Week output index (1957=100)	124.7	124.6	117.7
Chemical Week wholesale price index (1947=100)	108.9	108.9	111.5
Stock price index (12 firms, Standard & Poor's)	50.77	50.29	53.97
Steel ingot output (thousand tons)	1,582	1,524	2,674
Electric power (million kilowatt-hours)	14,315	14,744	14,333
Crude oil and condensate (daily av., thousand bbls.)	7,166	7,174	7,311

MONTHLY INDICATORS—Production 1957=100 (unadj.)	Latest Month	Preceding Month	Year Ago
All manufacturing	100	101	111
Nondurable goods manufacturing	108	107	111
Durable goods manufacturing	95	96	111
Chemicals and allied products	119	121	121
Industrial chemicals	128	126	127
Petroleum and coal products	107	107	108

CHEMICAL CUSTOMERS CLOSE-UP



THIS IS NEW SUPERFINE ALON®C colloidal aluminum oxide

Cabot research has produced an exciting new "flame-born" pigment whose superfine particle size offers a world of promise. We'd like you to try it...

New Alon C is produced through a unique, high temperature vapor phase flame hydrolysis process, similar to that used in the production of Cab-O-Sil®, Cabot's "white magic" superfine silica, and new superfine Titanium Dioxide P-25, a new Cabot TiO_2.

'Magic' did we say? Take a pinch of Alon C and rub it between your fingers, and you can see and feel what we mean. It's virtually like handling smoke.

It is this unique superfineness of flame-born Alon C that makes this pigment so versatile and broadens its usefulness into a whole new range of application areas. Some of the more common applications for which Alon C is being used are listed below. But just how versatile this new superfine material is, even Cabot doesn't know.

That's why we are extending to you an invitation to make your own tests with it. Free samples, complete information and technical assistance are yours for the asking. Just write: *Mr. H.P. Donohue, New Products Mgr.*

USES:

- **Flatting agent**
- **Reinforcing agent** — high temperature elastomers, such as nitrile rubber compounds
- **Raw material** — high purity and specialty ceramics
- **Anti-soiling agent** — natural textile fibers
- **Coating material** — electronic and fluorescent tubes
- **Free-flowing agent** — positively charged powders
- **Substrate** — synthetic pigments
- **Polishing agent** — metallographics
- **Tear resistance agent** — silicone rubber
- **Strengthening agent** — optical glass

PROPERTIES:

Color	White
Al_2O_3 Content (Moisture-Free Basis)	95% minimum
Average Particle Size Range	0.01-0.04 micron
Surface Area (B.E.T.)	50-100 m^2/gm.
Specific Gravity	3.3-3.6
Total Non Al_2O_3 Oxides	0.2% maximum
Free Moisture (105°C.)	2% maximum
Ignition Loss (1000°C.)	3% maximum
pH (10% Aqueous Solution)	4-5
Apparent Bulk Density	3-5 lb./$ft.^3$

CABOT CORPORATION

125 High St., Boston 10, Massachusetts, U.S.A., Att. of Mr. H. P. Donohue: CW
Please send ☐ free Alon C sample ☐ information on Alon C
I am interested in use of Alon C for

fill in your application(s) here

NAME

TITLE

COMPANY

ADDRESS

TITANOX®-RA-40 belongs in this picture...

... because TITANOX-RA-40 is rutile titanium dioxide especially suited to the pigmentation of modern vinyl tile compositions. This white pigment yields, at economically low loadings, whites and tints that meet the most exacting standards of the industry.

As TITANOX-RA-40 is so ideally suited to vinyl tile, so there are fifteen other types of TITANOX to meet the white pigmentation requirements of virtually anything that needs whitening, brightening and opacifying. No matter what your white pigment application, there is a TITANOX pigment for it. Titanium Pigment Corporation, 111 Broadway, New York 6, N.Y.; offices and warehouses in principal cities. In Canada: Canadian Titanium Pigments, Ltd., Montreal.

7999

TITANIUM PIGMENT CORPORATION
SUBSIDIARY OF NATIONAL LEAD COMPANY